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AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

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ELECTRICITY FOR LIGHTING GAS.

At a recent stated meeitng of the Franklin Institute, held in Philadelphia, Messrs. Cornelius & Baker exhibited a very beautiful method of *lighting gas* by means of frictional *electricity*, arranged for use with a bracket, two portable lighters, and a table light, all being simple in arrangement, and readily kept in order.

These instruments are constructed upon the principle of the electrophorus.

The electric *bracket* is arranged with a brass cup in the form of a vase, resting upon the bracket, with a connecting piece of hard rubber. This cup is lined with lamb skin covered with silk, and contains the hard rubber electric piece, which corresponds in form to the inside of the cup. A coiled wire connects the cup with a wire attached to the burner, and terminating just above the burner.

In order to light the gas, the stop is turned, the hard rubber piece lifted partly from the cup, thus liberating the spark and lighting the gas.

The *Portable Lighter* consists of the same vase or cup, with the addition of a non-conducting handle.

When the brass cup is lifted from the electric piece, and held to the conducting wire of the burner, the gas is immediately lighted.

Another portable instrument called *Double Air-Tight Electrophorus*, consists of two metallic tubes, each closed at one end, and connected together at the other, with a non-conducting ring of hard rubber, the inside being lined with lamb skin. A hard rubber rod is placed within them, the length of one of the tubes, and fitting them so as to move somewhat freely from end to end.

When the movable piece inside is allowed to fall to one end, and the tube is raised to the connecting wire of the burner, this piece changes its place again, falling into the tube held by the hand. The spark leaves the upper end of the tube at the same time and lights the gas.

The *Table Light Burner* consists of the same instrument, arranged upon a pivot regularly attached to the pillar light.

GORE'S GAS FURNACES.

In the *Ironmonger*, for July, 1863, we gave a brief description of a new patent Gas Furnace by Mr. G. Gore, of Birmingham. The principle of this furnace has since been applied upon a much larger magnitude, and furnaces on a commercial scale are now in use at the electro-plate manufactory of Messrs. Elkington, Birmingham, and elsewhere. These larger furnaces, as at present constructed, are capable of melting about 400 ounces of silver, copper, gold, German silver, or if desirable, even cast-iron. The amount of coal-gas consumed in one of these furnaces varies from 300 to 400 cubic feet per hour. With a consumption of 360 feet per hour the following results have been obtained:—266 ounces of sterling silver were perfectly melted within twenty-five minutes from the period of lighting the gas in the cold furnace, and the metal was sufficiently hot to cast for rolling in twenty minutes more. A second quantity of 266 ounces of the same metal was then introduced, and was perfectly melted in eleven minutes, with a consumption of sixty-six cubic feet of gas, value twopence, the price of gas being two shillings and eightpence per 1,000 feet; in a further period of fifteen minutes the metal was sufficiently hot to cast for rolling. A quantity (116 ounces) of German silver was then introduced, and melted in fifteen minutes, and after twenty-eight minutes longer heating various highly figured articles were cast in it in a most perfect manner.

The use of this furnace is extending rapidly, the smaller sizes being much used by dentists, jewellers, analytical chemists, assayers, enamellers, and others, in consequence of their readily fusing silver, gold, copper glass, or even cast-iron, without the aid of a bellows or lofty chimney, by simply lighting the gas; and the crucible and its contents being at all times protected from the air, and yet perfectly accessible for examination, stirring, removal, &c. The burners of the larger sized furnaces are formed of a series of plates of cast-iron, and may be readily removed from the furnace and employed to heat a retort, muffle, reverberatory chamber, or other apparatus where intense heat is required. It is intended to apply them to the heating of steam-boilers, and welding articles of wrought-iron.

The safety of these furnaces, their regularity and self-supplying action, and perfect freedom from dust and smoke, render them advantageous in such processes as enamelling, annealing, &c., where cleanliness and uniformity of heat are required. Their high degree of heat without the aid of a blast results from the very rapid and perfect mixture of the air and gas, the combustion being consequently effected and concentrated in a very small space.—*London Ironmonger.*

[On page 70 of this volume of the JOURNAL will be found an illustrated description of Mr. Gore's furnace for experimental, analytical and other purposes. A gas furnace, capable of doing the work which Gore's furnace is said to be able to do, will be found a great addition to the a paratus of a chemist's laboratory.]

ABSORPTION OF WATERY VAPORS BY COAL GAS.

At a meeting of the Royal Scottish Society of Arts, held in the Society's Hall, George street, Edinburgh, on Monday evening last, Dr. Stevenson Macadam in the chair,—Mr. John Reid, engineer to the Edinburgh and Leith Gas Companies, read a paper on "The Absorption of Volatile Hydrocarbon and Watery Vapors by Coal Gas." In describing a method he had devised for the purpose of preventing gas evaporating the water in meters, which, causing variations in the water level, occasioned continual fluctuations in the registration, Mr. Reid stated that he had found from experiments that, at a temperature of 50°, 1.20 ounce of water was evaporated per 1,000 feet of gas; at 63°, 1.78 ounce, and at 86°, 14.50 ounces. The question having occurred to him, whether it might not be possible to gratify this thirsty propensity in some less objectionable way than at present, he had found the means of doing so, in providing a separate and convenient watering-place outside, and distinct from the meter, wherein the gas might fully saturate itself with moisture, before being admitted inside the meter itself. Having carried out such an arrangement, he found it had completely fulfilled the object in view. A meter he had on the table—one of the well-made meters of Messrs. Milne and Son, of Edinburgh—was fitted up in a suitable manner for carrying out his object. The separate water chamber was a rectangular box two or three inches deep, occupying a space not more than the lateral dimensions of the meter, for which, as fitted up, it formed a suitable basement. It was subdivided inside by vertical partitions, into a number of narrow and parallel cells, running from front to back, and filled within half an inch of the top with water. On entering from the service pipe, at one end of the first cell, the gas runs along the cell on the water surface, and at its extremity, communicates with the adjoining cell, along which it passes on to the third, and so on, till, having traversed in this manner, over some nine or ten feet of these cellular passages, in all of which it is exposed to the water, the gas emerges from the opposite corner of the vessel, and entering the meter at a pipe, at the usual entrance on the left hand upper corner, it is accurately measured and registered in the usual way, before passing on to the burners. As an example of the manner in which this contrivance is suited to the purpose intended, he had only further to state that this same meter, on being charged with the proper quantity of water required for accurate measurement, was carefully weighed. Thereafter, 71 ounces of water being put into the saturating vessel, it was set to work in supplying an ordinary dwelling-house, where it continued untouched for eighteen months. At the end of the time, the index showed that 35,000 feet of gas had been duly registered as having passed through the meter. On being removed and carefully weighed, it was found that 53 ounces of water had been evaporated and disappeared from the saturator—being nearly 1½ ounce per 1,000 feet—while the water originally put into the meter itself was found to have sustained no perceptible diminution whatever. And, therefore, so far as affected by the condition of the water level, the registration must have been absolutely correct.—*Sanitary Reporter.*

GAS IN ENGLAND.

The Sheppy Gas Consumers' Company, Sheerness, have declared a dividend after the rates of four and five per cent. per annum on two classes of preference shares respectively, and a dividend of ten per cent. per annum on all ordinary shares paid up on the last day of that year. The directors contemplate reducing the price of the gas, now charged at 5s. per 1,000 cubic feet, at the end of the present year.....The Southwell Gas-Light and Coke Company (Limited) have declared a dividend of £6 per cent., leaving £119 to the current account.....At the Selly Oak Nail Works, Birmingham, a new system of coke-burning has been adopted, whereby the offensive and pernicious gases which usually escape to taint the atmosphere and injure vegetation, are turned to good account by being conveyed to a neighboring furnace or fire, either for blast-heating, generation of steam, or other purposes where they can be usually consumed. There is also, it is said, a complete removal from the coal of all sulphurous properties, and thousands of tons of coal now considered of no use may thus be converted into strong and good coke. The invention is patented by Messrs. J. & C. Hawkins, of Walsall. The *Builder* first suggested the utilization of the gas in coke-burning, and several plans have since been put into practice, but this is the last he have heard of.—*London Builder.*

BOSTON GAS INSPECTION.—Frederick E. Stimpson, Inspector of Gas Meters and Gas, reports the quality of gas supplied by the Boston Gas-light Company for the month of March, as follows: The illuminating power averaged 16.76 candles, and ranged from 15.32 to 18.48 candles. The volume of hydrocarbons condensible by bromine varied from 5.6 to 8.2 per cent., with an average of 6.58 per cent. Of the impurities present there was found from 2 to 3.92 per cent. of carbonic acid, making an average of 2.86 per cent. of volume. There were no indications of either sulphuretted hydrogen or ammonia in the gas.

GAS-LIGHT COMPANIES IN THE UNITED STATES.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS
1857	ADRIAN	Mich.	50,000	50	—	May & November.	4,000	3 50	....	....	
1856	AKRON	O.	20 000	33⅓	—	Do.	3,500	3 00	....	....	
1845	ALBANY	N. Y.	25 . 0	20	4	January & July.	65,000	3 00	120	....	None in market.
1838	ALBION	N. Y.	30,000	100	—	Do.	3,000	3 80	....	....	
1851	ALEXANDRIA	Va.	106,520	—	—	City Works.	9,000	3 50	....	....	
1852	ALLEGHANY	Pa.	200,000	25	4	May & November.	25,000	3 00	....	....	
1853	ALLENTOWN	Pa.	60,000	100	3½	Do.	5,000	3 50	....	....	
1857	ALTON	Ill.	75,000	—	—	Private Works.	4,000	3 50	....	....	
1859	ALTOONA	Pa.	40,000	20	4	January & July.	5,000	3 00	....	....	
1859	AMESBURY AND SALISBURY	Mass.	30,000	25	—	Do.	7,000	4 00	....	....	
1859	ANNAPOLIS	Md.	100,000	25	—	Do.	4,000	4 00	....	....	
1858	ANN ARBOR	Mich.	23,000	50	5	March & September.	5,500	4 00	....	....	
1858	ASTORIA	N. Y.	20,000	50	—	Do.	6,000	4 00	....	....	
1858	ATLANTA	Ga.	50,000	25	5	January & July.	12,000	5 00	....	....	
1855	ATTLEBORO'	Mass.	6,000	50	3	Do.	2,000	6 00	....	....	
1857	AUBURN	N. Y.	80,000	50	5	Do	10,000	7 00	....	....	
1850	AUGUSTA	Ga.	80,000	25	8	Do.	9,000	6 00	....	....	
1851	AUGUSTA AND HALLOWELL	Me.	84,700	50	5	Do.	10,000	4 00	....	....	
1853	AURORA	Ind.	10,000	—	—	Private Works.	3 500	3 50	....	....	{ Formerly used Sanders' Water-Gas. Recently altered to Coal Gas-Works.
1860											None for sale.
1817	BALTIMORE	Md.	550,000	100	5	June & December.	150,000	2 50	150	....	
1852	BANGOR	Me.	120,000	100	2½	January & July.	12,000	3 00	100	....	
1855	BATAVIA	N. Y.	32,000	20	4	Do.	2,500	4 00	100	100	Stock firm. Good works and well managed.
1853	BATH	Me.	65,000	100	3	April & October.	10,000	3 75	....	....	
1859	BATH	N. Y.	15,000	50	—	May & November.	3,000	7 00	....	....	
1861	BATTLE CREEK	Mich.	15,000	—	—	January & July.			....	....	
1858	BELFAST	Me.	14,000	100	—	Do.	7,000	7 00	....	....	
1856	BELLEFONT	Pa.	20,000	25	2	Do.	3,500	4 00	....	....	
	BELOIT	Wis.	30,000	—	—	Do.	4,000	4 00	....	....	
1854	BETHLEHEM	Pa.	50,000	50	4	June & December.	2,000	3 20	....	....	
1859	BEVERLY	Mass.	40,000	100	—	January & July.	4,000	4 00	....	....	
1853	BINGHAMPTON	N. Y.	50,000	50	3½	Do.	10 000	4 00	....	....	
1859	BIRMINGHAM	Pa.	40,000	50	—	Do.	4,000	4 00	....	....	
1855	BLOOMINGTON	Ill.	40,000	50	—	Do.	6,000	4 00	....	....	
1853	BORDENTOWN	N. J.	50,000	25	3	June & December.	4,000	3 80	....	....	
1822	BOSTON	Mass.	1,000,000	500	5	Do.	130,000	2 50	....	....	
1859	BRATTLEBORO'	Vt.	21,000	—	—	Do.	3,000	4 00	....	....	
1851	BRIDGEPORT	Ct.	90,000	25	4	January & July.	10,000	4 00	90	....	Passed last dividend.
1857	BRIDGETON	N. J.	50,000	20	—	Do.	5,000	4 00	....	....	
1856	BRISTOL	Pa.	30,000	25	3	February & August.	3,000	4 00	....	....	
1855	BRISTOL	R. I.	35,000	50	2	January & July.	6,000	4 00	....	....	
1850	BROCKPORT	N. Y.	25,000	100	3	Do.	1,500	4 00	....	....	
1853	BROOKLINE	Mass.	77,000	100	4	February & August.	3,500	3 50	....	....	
1825	BROOKLYN	N. Y.	2,000,000	25	5	January & July.	75,000	2 50	170	160	
	BROWNSVILLE	Pa.				Do.			....	....	
1848	BUFFALO	N. Y.	600,000	50	5	Do.	70,000	2 90	140	125	
1852	BURLINGTON	N. J.	100,000	25	3½	Do.	5,000	4 00	105	....	
1853	BURLINGTON	Vt.	75,000	25	2½	Do.	10,000	4 50	....	....	
1859	BURLINGTON	Iowa.	65,000	50	—	Do.	8,000	4 00	....	....	
1861	CALAIS	Me.	90,000	100	—	Do.	10,000	3 50	....	....	
1852	CAMBRIDGE	Mass.	300,000	100	5	February & August.	20,000	3 50	100	97½	
1852	CAMDEN	N. J.	300,000	100	3	April & October.	15,000	3 85	105	100	
1853	CANANDAIGUA	N. Y.	50,000	50	—	January & July.	3,000	4 00	90	80	
1856	CANTON	O.	19,000	50	6	March & September.	6,000	3 00	....	....	
1853	CAPE ISLAND	N. J.	80,000	100	—	October.	10,000	6 00	....	....	{ Watering place.—These Works only run in summer.
1860	CARBONDALE	Pa.	16,000	25	—	March & September.	5,000	4 00	....	....	
1855	CARLISLE	Pa.	30,000	25	—	January & July.	4,000	4 00	....	....	
1856	CATASAUQUA	Pa.	15,000	25	5	May & November.	2,000	4 00	....	....	
1858	CATSKILL	N. Y.		—	—	Private Works.	3,000	3 00	....	....	Owned by G. T. Sutton.
1857	CHAMBERSBURG	Pa.	30,000	25	—	January & July.	3,000	4 00	....	....	
1846	CHARLESTON	S. C.	723,800	25	4	Do.	50,000	4 00	....	....	
1851	CHARLESTOWN	Mass.	200,000	50	4	Do.	30,000	3 00	....	....	
1858	CHARLOTTE	N. C.	14,000	50	10	March & September.	3,500	6 00	....	....	
1859	CHARLOTTEVILLE	Vt.	15,000	25	—	Do.	4,000	4 50	....	....	
1851	CHELSEA	Mass.	100,000	100	3½	January & July.	8,000	3 50	....	....	
1856	CHESTER	Pa.	35,000	25	3	April & October.	4,000	4 00	....	....	
1849	CHICAGO	Ill.	1,300,000	25	5	January & July.	100,000	2 50	150	140	Very scarce. Stock wanted.
1857	CHICOPEE	Mass.	50,000	20	—	Do.		4 00	....	....	
1851	CHILLICOTHE	O.	40,000	25	4	Do.	12,000	3 50	....	....	
1841	CINCINNATI	O.	1,600,000	100	5	Do.	225,000	2 50	....	....	
1859	CITIZENS', BROOKLYN	N. Y.	1,000,000	20	—	Do.	135,000	3 00	128	125	
1860	CITIZENS', READING	Mass.	20,000	100	—				....	....	
	CLARKESVILLE	Tenn.	100,000	50	—	Do.	5,000	4 00	....	....	
1860	CLAREMONT	N. H.	20 000	100	—	March & September.	3,000	4 00	....	....	
1846	CLEVELAND	O.	200,000	10	5	January & July.	20,000	3 00	....	....	
1858	CLINTON	Mass.	30,000	500	5	Do.	3,000	4 00	....	....	
1859	CLYDE	N. Y.	10,000	50	4	Do.	2,500	4 00	....	....	
1854	COHOES	N. Y.	50,000	20	3½	April & October.	5,000	3 60	....	....	{ Formerly Rosin-Gas, but now Coal. A well managed company. Stock firmly held.
1860	COLD SPRING	N. Y.	30,000	50	—	Do.	3,500	4 00	95	....	
1860	COLD WATER	Mich.	25,000	50	5	January & July.	4,000	4 60	....	....	
1852	COLUMBIA	Pa.	37,500	25	—	Do.	4,000	3 50	....	....	
1852	COLUMBIA	S. C.	44,000	25	4	Do.	6,000	6 00	....	....	
1857	COLUMBIA	Cal.	50,000	25	—	Do.	4,500	10 00	....	....	
1858	COLUMBUS	Ga.	54,000	25	5	Do.	5,000	7 00	....	....	
1850	COLUMBUS	O.	100,000	10	6	Do.	30,000	3 00	....	....	
1858	CONCORD	N. H.	50,000	50	5	Do.	8,000	3 50	....	....	
1853	COVINGTON AND NEWPORT	Ky.	100,000	50	3½	Do.	28,000	4 00	....	....	
1854	CUMBERLAND	Md.	60,000	50	3	Do.	6,000	4 00	....	....	
1857	DANBURY	Ct.	50,000	25	4	Do.	2,000	3 75	....	....	
1856	DANVILLE	Pa.	30,000	25	—	June & December.	3,000	4 00	....	....	
1855	DAVENPORT	Iowa.	56,000	100	—	Do.	6,000	5 00	....	....	
1848	DAYTON	O.	50,000	25	5	February & August.	8,000	3 50	....	....	
1858	DEDHAM	Mass.	40,000	50	—	January & July.	3,000	4 00	....	....	
1860	DELAWARE	O.	30,000	25	—	Do.	2,500	3 00	....	....	
1849	DETROIT	Mich.	500,000	50	5	Do.	30,000	3 50	160	150	Excellen tock. No sales.
1860	DOBBS' FERRY	N. Y.	25,000	—	—	Do.	3,000	4 00	....	....	
1854	DORCHESTER	Mass.	150,000	100	—	Do.	14,000	4 00	....	....	
1859	DOVER	Del.	12,000	—	—	Private Works.	2,000	4 00	....	....	
	DOVER	N. H.				January & July.			....	....	
1857	DOYLESTOWN	Pa.	50,000	—	—	Do.	3,000	4 00	....	....	
1854	DUBUQUE	Iowa.	50,000	115	8½	Do.	17,000	4 50	....	115	This stock is wanted at par.
1853	EAST BOSTON	Mass.	133,000	25	4	Do.	20,000	3 50	....	145	No transactions.
1858	EAST GREENWICH	R. I.	11,200	100	15	Do.	3,000	7 00	....	....	
1861	EAST HAMPTON	Mass.	10,000	25	—	Do.	5,000	9 00	....	....	
1861	EAST NEW YORK	N. Y.	50,000	50	—	Do.	12,000	3 50	....	....	
1857	EASTON	Md.	9,000	10	—	Do.	1,500	7 00	....	....	
1850	EASTON	Pa.	125,000	50	4	June & December.	6,000	3 60	....	....	
1856	EASTPORT	Me.	50,000	55	—	Do.	3,000	4 00	....	....	
1855	ELIZABETH	N. J.	100,000	20	4	January & July.	14,000	3 50	....	....	
	ELLICOTT'S MILLS	Md.	10,000	—	—	Do.	4,000	4 00	....	....	
1852	ELMIRA	N. Y.	50,000	25	3½	Do.	5,000	4 00	....	....	
1852	ERIE	Pa.	68,000	50	3½	June & December.	10,000	3 00	....	....	
1853	EVANSVILLE	Ind.	60,000	50	4	January & July.	12,000	4 00	110	....	A very good Company.
	EXETER	N. H.	60,000	—	—	Do.	12,000		....	....	
	FAIR HAVEN	Ct.	20,000	25		Do.	8,000	4 00	....	....	
1847	FALL RIVER	Mass.	26,000	—	—	Private Works.	12,000	3 50	....	....	
1859	FAYETTEVILLE	N. C.	25,000	100	6	January & July.	7,000	6 00	....	....	
	FIFTH WARD (Milwaukee)	Wis.	50,000	25	—	Do.	10,000	4 00	....	....	
1857	FISHKILL	N. Y.	10,000	20	—	April & October.	1,500	9 00	....	....	Make Petroleum-Gas.
1853	FITCHBURG	Mass.	100,000	50	3	January & July.	5,000	4 00	....	....	
1859	FLEMINGTON	N. J.	20,000	—	—	Do.	3,000	4 00	....	....	
1855	FLUSHING	N. Y.	20,000	50	1½	March & September.	6,500	4 00	....	....	
1858	FOLSOM	Cal.								....	
	FORT WAYNE	Ind.	40,000	25	—	Do.	6,000	4 00	....	....	
1851	FRANKFORT	Ky.	50,000	—	—	City Works.	5,500	4 50	....	....	
1851	FREDERICK CITY	Md.	36,000	100	—	January & July.	5,000	6 70	....	....	
1854	FREDERICKSBURG	Va.	72,500	50	5	Do.	4,500	4 00	....	....	
1858	FREDONIA (Natural Gas)	N. Y.	10,000	100	—	Do.	2,000	4 00	....	....	Unlimited supply of Natural Gas.
1856	FREEPORT	Ill.	20,000	100	—	May & November.	10,000	4 00	....	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

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CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	FREMONT	O.	25,000	25	—	May & November.	2,000	4 50	....	....	
1858	FULTON	N. Y.	12,000	100	—	Do.	4,000	7 00	....	....	
1855	GALENA	Ill.	70,000	100	—	Do.	8,000	4 00	....	....	
1859	GALION	O.	25,000	25	—	January & July.	1,800	3 00	....	....	
1858	GALVESTON	Texas.	150,000	50	—	May & November.	7,000	6 00	....	....	
1854	GARDINER	Me.	100,000	50	4	Do.	8,000	4 00	....	....	
1853	GENEVA	N. Y.	75,000	25	2½	Do.	6,000	4 00	....	....	
1851	GERMANTOWN	Pa.	Merged	into	the	Philadelphia Works.	12,000	2 25	....	....	
1859	GETTYSBURG	Pa.	20,000	50	3	January & July.	2,500	4 00	....	....	
1854	GLENN'S FALLS	N. Y.	35,000	50	3	February & August.	4,000	4 00	....	....	
1854	GLOUCESTER	Mass.	40,000	50	—	January & July.	5,000	3 50	....	....	
1857	GLOVERSVILLE	N. Y.	15,000	25	—	Do.	3,000	3 50	....	....	
1858	GRAND RAPIDS	Mich.	50,000	20	—	Do.	3,000	4 00	....	....	
1855	GREAT BARRINGTON	Mass.	5,000	100	5	April & October.	2,000	7 00	....	....	
1849	GREAT FALLS	N. H.	50,000	100	3	Do.	3,000	4 00	....	....	
1860	GREENFIELD	Mass.	20,000	50	2	January & July.	2,500	4 00	....	....	
1853	GREENPOINT	N. Y.	100,000	50	5	Do.	20,000	3 00	....	....	Close corporation.
1859	GREENSBORO'	N. C.	12,000	50	—	April & October.	3,000	7 00	....	....	
1858	GREENSBURG	Pa.	30,000	25	3	May & November.	2,000	3 00	....	....	
1854	HAGERSTOWN	Md.	15,000	20	—	January & July.	2,000	6 00	....	....	
	HAMILTON	O.	15,000			Do.			....	....	
1859	HANNIBAL	Mo.	100,000	100	—	Do.	6,000	3 50	....	....	
1857	HARLEM	N. Y.	350,000	50	3½	Do.	25,000	3 00	....	145	
1855	HARRISBURG	Pa.	100,000	—	4	Do.	5,000	4 00	....	....	
1849	HARTFORD	Ct.	200,000	25	4	Do.	25,000	3 00	150	140	Stock in demand.
	HASTINGS	N. Y.				Do.	8,000	4 00	..	....	
1853	HAVERHILL	Mass.	50,000	50	—	Do.	5,000	4 00	....	....	
1859	HAVERSTRAW	N. Y.	20,000	100	—	Do.	5,000	4 00	....	....	
1861	HAYESVILLE	Mass.	15,000	25		Do.	4,000	4 00	....	....	
1859	HEMPSTEAD	N. Y.	16,000	25	—	Do.	1,000	4 00	....	....	
1862	HOBOKEN	N. J.	100,000	25	3	Do.	30,000	2 50	...	100	Works not yet built.
1856	HOLLIDAYSBURG	Pa.	30,000	25	2	Do.	4,000	3 50	....	....	
1861	HOLYOKE	Mass.	20,000	25	—	Do.	3,000	4 00	....	....	
1861	HOMER & CORTLANDT	N. Y.	40,000	100	—	Do.	6,000	4 00	....	....	
1854	HONESDALE	Pa.	30,000	25	3	Do.	2,500	4 00	....	....	
1860	HORNELLSVILLE	N. Y.	12,000	50	—	Do.	2,000	4 00	....	....	
1853	HUDSON	N. Y.	50,000	100	3½	February & August.	3,000	4 00	....	....	
	HUNTER'S POINT	N. Y.									
1857	HUNTINGTON	Pa.	18,000	50	3	Do.	2,000	3 50	....	....	
1856	HUNTSVILLE	Ala.	7,325	25	—	June & December.	2,000	5 00	....	....	
	INDIANAPOLIS	Ind.	150,000	—	—	Do.	15,000	5 00	....	....	
1857	IOWA CITY	Iowa.	40,000	50	—	February & August.	4,000	4 50	....	....	
1852	ITHACA	N. Y.	75,000	25	3½	January & July.	6,000	4 00	....	....	
1857	JACKSON	Mich.	25,000	50	5	Do.	6,000	3 50	....	....	
	JACKSON	Miss.	80,000	50	—	Do.	4,000	4 50	....	....	
	JACKSON	Cal.	50,000	30	—	Do.	4,000	10 00	....	....	
	JACKSONVILLE	Flor.	30,000	20	—	Do.	2,000	7 00	....	....	
	JACKSONVILLE	Ind.	50,000	50	—	Do.	4,000	5 00	....	....	
1858	JACKSONVILLE	Mo.	25,000	25	—	Do.	7,000	6 00	....	....	
1856	JAMAICA	N. Y.	20,000	—	4	Do.	6,000	4 00	....	....	
1853	JAMAICA PLAIN	Mass.	78,000	100	3	Do.	3,000	3 00	....	....	
	JAMESTOWN	N. Y.	25,000	—	—	Do.	4,000	4 00	....	....	
1856	JANESVILLE	Wis.	50,000	100	—	Do.	12,000	4 00	....	....	
	JEFFERSONVILLE	Md.	30,000	25		Do.	4,000	4 00	....	....	
1853	JERSEY CITY	N. J.	300,000	—	5	Do.	30,000	3 00	150	....	
1858	JERSEY SHORE	Pa.	15,000	25	—	Do.	2,000	3 70	....	....	No sales since formation of Hoboken Co.
1856	JOHNSTOWN	Pa.	50,000	25	3	Do.	8,000	3 00	....	....	
1857	JOLIET	Ill.	300,000	100	—	June & December.	6,000	4 00	....	....	
1858	KALAMAZOO	Mich.	30,000	50	5	Do.	10,000	4 00	....	....	
1860	KEENE	N. H.	60,000	100	—	Do.	4,500	4 00	....	....	
1855	KEOKUK	Iowa.	100,000	100	—	January & July.	10,000	4 50	....	....	
1855	KINGSTON	Pa.	50,000	50	—	Do.	3,000	4 00	....	....	
1859	KITTANNING	Pa.	20,000	—	—	Doubtful.	5,000	4 00	....	....	Said to be a fraud.
1854	KNOXVILLE	Tenn.	63,000	—	—	April & October.	4,000	5 00	....	....	
1860	LACONIA	N. H.	20,000	100	—	Do.	4,000	6 00	....	....	
1859	LA CROSSE CITY	Wis.	100,000	50	—	June & December.	10,000	8 00	....	....	Petroleum and Wood Gas.
1854	LAFAYETTE	Ind.	60,000	50	4	January & July.	10,000	3 25	....	....	
1856	LAMBERTVILLE	N. J.	30,000	25	—	Do.	2,600	4 00	....	....	
1849	LANCASTER	Pa.	100,000	50	4	Do.	10,000	3 00	....	....	
1856	LANCASTER	O.	25,000	100	5	Do.	5,000	3 50	....	....	
1855	LANSINBURG	N. Y.	25,000	100	—	Private Works.	7,000	4 00	....	....	
1849	LAWRENCE	Mass.	200,000	100	4	February & August.	15,000	3 50	....	....	
1859	LEAVENWORTH	Kansas.	200,000	25	—	Private Works.	15,000	4 00	....	....	
1856	LEBANON	Pa.	26,000	50	—	February & August.	5,000	4 00	....	....	
1861	LE ROY	N. Y.	25,000	50	—	Do.	4,000	4 00	....	....	
1858	LEWISBURG	Pa.	20,000	100	—	January & July.	4,000	4 00	....	...	
1852	LEWISTON	Me.	100,000	100	3	Do.	10,000	3 20	....	....	
1856	LEWISTOWN	Pa.	30,000	50	3	April & October.	3,000	3 10	....	....	
1853	LEXINGTON	Ky.	100,000	25	4	January & July.	5,000	4 00	...	....	
1853	LITTLE FALLS	N. Y.	112,000	25	—	Do.	3,500	7 00	....	....	
1861	LITTLE ROCK	Ark.	20,000	—	—	Do.	5,000	6 00	....	....	
1858	LOCKHAVEN	Pa.	28,000	—	—	Do.	3,000	4 00	....	....	
	LOCKPORT	N. Y.	100,000	50	—	Do.	4,000	4 00	...	....	
	LOGANSPORT	Ind.	40,000		5	April & October.	5,000	4 00	105		But $481,400 stock has been sold. This Company has a large contingent fund and undivided profit on hand.
1838	LOUISVILLE	Ky.	600,000	50	6	January & July.	80,000	2 50	125	....	
1849	LOWELL	Mass.	200,000	25	5	Do.	50,000	3 25	....	....	
1852	LYNCHBURG	Va.	70,000	25	5	Do.	6,000	3 80	....	....	
1852	LYNN	Mass.	55 000	50	4	Do.	20,000	4 00	....	....	
1859	LYONS	N. Y.	30,000	100	—	Do.	4,000	4 00	....	....	
1852	MACON	Ga.	75,160	25	6	Do.	5,000	5 00	....	....	
1851	MADISON	Ind.	160,000	25	3	Do.	10,100	3 50	....	....	
1855	MADISON	Wis.	100,000	25	—	Do.	5,000	5 00	....	....	
1854	MALDEN & MELROSE	Mass.	50,600	25	3	February & August.	5,000	4 00	....	....	
1852	MANAYUNK	Pa.	40,000	100	—	Do.	7,000	4 00	....	....	
1852	MANCHESTER	N. H.	100,000	100	5	January & July.	25,600	3 00	....	....	
1830	MANHATTAN (N. Y. City)	N. Y.	4,000,000	50	5	Do.	600,000	2 50	....	....	
	MANSFIELD	O.	25,000	—	—	Do.	10,000	4 00	....	....	
1854	MARBLEHEAD	Mass.	40,000	100	3	Do.	1,000	4 00	....	....	
	MARLBORO'	Mass.	20,000	—	—	Do.	8,000	4 00	....	....	
	MAUCH CHUNK	Pa.	50,000	50	—	Do.	7,000	4 00	....	....	
1857	MARIETTA	O.	50,000	50	—	Do.	7,000	4 00	....	...	Stock firm.
1860	MARION	O.	12,000	25	5	April & October.	1,500	13 55	....	....	
1858	MARYSVILLE	Cal.	50,000	100	—	January & July.	4,000	2 50	....	....	
1857	MASSILON	O.	20,000	25	—	Do.	5,000	3 00	....	....	
1855	MEADVILLE	Pa.	39,000	25	3	Do.	4,000	3 50	....	....	
	MEDINA	N. Y.	2,000	100	—	Do.	2,000	7 00	....	....	
1852	MEMPHIS	Tenn.	300,000	100	5	June & December.	12,000	5 00	....	....	
	MERIDEN	Ct.	20,000			Do.			....	....	
1859	METROPOLITAN (N. Y. City)	N. Y.	1,000,000	100	—	January & July.	200,000	2 50	....	....	
1859	MIDDLEBORO'	Mass.	15,000	—	—	Private Works.		6 00	....	....	
1853	MIDDLETOWN	Ct.	50,000	25	3	March & September.	5,000	3 80	....	....	Owned by G. T. Sutton.
	MIDDLETOWN	N. Y.		25	—	Private Works.	3,000	3 00	....	....	
	MILFORD	Mass.	20,000	—	—	Do.		4 00	....	....	
	MILLEDGEVILLE	Ga.	100,000	50	—	Do.		5 00	...	....	
	MILTON	Pa.	10,000			Do.			....	....	
1847	MILWAUKEE	Wis.	400,000	50	5	January & July.	24,000	3 50	150	....	
1852	MOBILE	Ala.	200,000	—	—	Do.	30,000	4 50	....	....	
1836	MONROE	Mich.	40,000	50	—	Do.	5,000	3 50	50	....	
1852	MONTGOMERY	Ala.	100,000	25	4	February & August.	7,000	6 00	....	....	
1856	MONTPELIER	Vt.	30,000	25	3	January & July.	5,000	4 50	....	....	
1859	MORRISANIA	N. Y.	30,000	50	—	Do.		4 00	....	....	
1859	MORRISTOWN	N. J.	18,000	50	—	Do.	3,500	4 00	....	....	
1854	MOUNT HOLLY	N. J.	16,650	25	3	April & October.	2,000	7 00	....	....	
	MOUNT VERNON	O.	50,000	100	—	Do.		4 00	....	....	
1857	MUSCATINE	Iowa.	50,000	100	—	January & July.	3,000	4 50	...	....	
1854	NANTUCKET	Mass.	50,000	100	3	February & August.	6,000	4 00	....	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1852	Nashua	N. H.	45,000	50	2½	January & July.	10,000	3 50	....	....	
1850	Nashville	Tenn.	200,000	50	5	Do.	25,000	3 50	....	....	
1858	Natchez	Miss.	46,000	50	—	Do.	20,000	5 00	....	....	
	Nevada City	Cal.							....	....	
1852	New Albany	Ind.	200,000	50	3½	Do.	16,000	3 50	....	....	
1846	Newark	N. J.	262,000	50	5	Do.	45,000	3 62	180	....	Always a favorite stock.
1856	Newark	O.	30,000	100	—	Do.	7,000	5 40	....	....	
1852	New Bedford	Mass.	180,000	100	5	Do.	15,000	2 90	102	....	Well managed and kept quiet.
1859	Newbern	N. C.	22,000	100	6	Do.	6,000	3 50	....	....	
	New Britain	Ct.	80,000	20	5	Do.	3,000	4 00	....	....	
1851	New Brunswick	N. J.	100,000	20	4	Do.	8,000	3 00	115	....	
1852	Newburg	N. Y.	67,000	20	4	Do.	10,000	4 00	105	....	
1852	Newburyport	Mass.	150,000	10	4	Do.	9,000	4 00	92½	....	
1857	Newcastle	Del.	32,300	10	3	Do.	4,000	4 00	90	....	
1847	New Haven	Ct.	250,000	25	4	Do.	20,000	3 00	155	....	None in market.
1853	New London	Ct.	70,000	50	3	Do.	12,000	4 00	105	....	
1835	New Orleans	La.	1,500,000	100	6	Do.	120,000	4 00	180	....	
1853	Newport	R. I.	150,200	100	4	Do.	10,000	3 50	112	....	
1854	Newton & Watertown	Mass.	92,000	100	2	Do.	10,000	4 00	....	....	
	Newton	N. J.	30,000	—	—	Do.	3,000	4 00	....	....	
	Newton	Pa.	20,000	50	—	Do.	2,500	4 00	....	....	
	Newtown	N. Y.									
1823	New York	N. Y.	1,000,000	50	5	May & November.	100,000	2 50	300	....	
1839	Niagara Falls	N. Y.	15,000	25	—	Do.	3,000	4 00	90	....	
	Norfolk	Va.	60,000	25	—	Do.	40,000	4 00	....	....	
1853	Norristown	Pa.	41,700	25	4	June & December.	8,000	3 50	....	....	
1855	North Attleboro'	Mass.	50,000	100	3½	Do.	6,000	4 00	....	....	
	Northern Liberties	Pa.	400,000	25	7	City Works.	40,000	2 50	....	....	
	North Adams	Mass.	25,000	—	—	March & September.	30,000	4 00	....	....	
1856	Northampton	Mass.	35,000	25	3	January & July.	4,500	4 00	....	....	
1859	North Bridgewater	Mass.	16,000	100	4	June & December.	1,000	7 00	....	....	
1856	Norwalk	Ct.	30,000	150	4	February & August.	6,000	4 00	....	....	
1850	Norwalk	O.	50,000	25	—	January & July.	4,000	4 00	....	....	
1854	Norwich	Ct.	75,000	25	3½	Do.	12,000	3 50	....	....	
1861	Norwich	N. Y.	12,000	50	—	Do.	2,500	4 00	....	....	
1859	Nyack	N. Y.	20,000	100	—	Do.	2,500	4 00	....	....	
1860	Oberlin	O.	10,000	—	—	Do.	1,200	4 00	....	....	
1855	Ogdensburg	N. Y.	75,000	50	5	Do.	9,000	4 00	....	....	
1859	Orange	N. J.	65,000	25	—	Do.	6,000	3 50	....	....	
1852	Oswego	N. Y.	81,250	100	3½	Do.	15,000	4 00	105	....	
1855	Ottawa	Ill.	45,000	100	6½	Do.	6,000	4 00	....	....	Good works, built by Hoy, Jr., & Kennedy.
1856	Owego	N. Y.	40,000	50	3½	Do.	5,000	4 00	....	....	
1860	Owensboro'	Ky.	25,000	25	—	Do.	4,000	3 50	....	....	
1856	Paducah	Ky.	75,000	100	—	May & November.	4,000	5 00	....	....	
1861	Painsville	O.	40,000	25	5	Do.	2,500	5 00	....	....	
1856	Palmyra	N. Y.	12,000	25	—	January & July.	3,000	7 00	....	....	
1847	Paterson	N. J.	125,000	25	3	Do.	20,000	3 50	95	....	
1850	Pawtucket	R. I.	75,000	50	4	Do.	12,000	3 00	....	....	
1855	Peekskill	N. Y.	81,000	50	3	June & December.	4,000	4 00	....	....	Surplus $10,000, May 15, 1863.
1860	Penn Yan	N. Y.	12,000	50	5	Do.	3,000	4 00	....	....	Works leased to Gilbert T. Sutton.
1859	Peoples', Chicago	Ill.	500,000	50	New	Do.	100,000	2 50	....	....	
1855	Peoria	Ill.	100,000	50	4	Do.	8,000	3 50	....	....	What is this Company doing?
1852	Petersburg	Va.	120,000	—	5	January & July.	20,000	3 50	....	....	
1841	Philadelphia	Pa.	3,000,000	50	—	City Works.	650,000	2 50	....	....	
1855	Piqua	O.	50,000	50	—	January & July.	6,500	4 00	....	....	
1835	Pittsburg	Pa.	800,000	100	5	Do.	60,000	1 50	115	....	
1854	Pittsfield	Mass.	50,000	100	5	Do.	4,500	4 00	....	....	
1858	Placerville	Cal.	30,000	50	—	Do.	4,500	10 00	....	....	
1860	Plainfield	N. J.	25,000	50	—	Do.	2,500	4 00	....	....	
1859	Plattsburg	N. Y.	16,000	50	—	January & July.	5,000	7 00	....	....	
1853	Plymouth	Mass.	40,000	100	—	April & October.	8,000	4 00	....	....	
1860	Port Chester	N. Y.	50,000	50	—	Do.	4,000	4 00	....		
1860	Port Jervis	N. Y.	20,000	100	—	Do.	5,000	4 10	....	....	
1849	Portland	Me.	300,000	50	4	January & July.	30,000	3 00	....	....	
1859	Portland	Oreg.	50,000	50	—	Do.	3,500	8 00	....	....	
1850	Port Lavacca	Texas.	50,000	100	—	Do.	2,500	7 00	....	....	
1851	Portsmouth	N. H.	70,000	100	8	April & October.	6,500	3 70	....	....	
1855	Portsmouth	O.	50,000	50	4	January & July.	10,000	3 50	....	....	
1855	Portsmouth	Va.	100,000	50	4	Do.	4,000	4 00	....	....	
1856	Pottstown	Pa.	20,000	50	3	Do.	3,500	4 00	....	....	
1850	Pottsville	Pa.	110,000	50	2	Do.	10,000	3 50	....	....	
1850	Poughkeepsie	N. Y.	84,000	25	4	March & September.	15,000	3 50	120	110	
1848	Providence	R. I.	1,000,000	50	4	January & July.	60,000	3 00	122	....	
1858	Quincy	Ill.	300,000	50	4	June & December.	12,000	3 50	....	....	
	Quincy	Mass.	60,000	00	—	Do.	00,000	0 00	....	....	
1855	Racine	Wis.	43,500	25	—	Do.	7,000	3 50	....	....	
1857	Rahway	N. J.	50,000	20	—	January & July.	5,000	4 00	....	....	
1858	Raleigh	N. C.	25,000	100	6	May & November.	5,000	6 00	....	....	
1848	Reading	Pa.	100,000	25	4	January & July.	25,000	3 00	....	....	
1851	Richmond	Va.	341,975	—	—	City Works.	30,000	3 00	....	....	Jeff. Davis has extinguished the gas-lights of Richmond, Va.
1859	Richmond	Mass.	40,000	25	—	January & July.	3,000	4 00	....	....	
	Richmond County	N. Y.									
1859	Ripley	O.	25,000	50	—	April & October.	2,000	4 00	....	....	
1852	Rochester	N. Y.	200,000	50	5	January & July.	50,000	2 50	....	....	
1857	Rockford	Ill.	40,000	50	—	Do.	4,000	4 00	....	....	
1854	Rock Island	Ill.	100,000	50	—	Do.	6,000	4 50	....	....	
1854	Rockland	Me.	50,000	100	—	Do.	6,000	4 40	....	....	
1852	Rome	N. Y.	85,000	100	3½	Do.	10,000	3 60	....	....	
1854	Rondout and Kingston	N. Y.	65,150	20	3½	June & December.	10,000	3 80	....	....	
1854	Roxbury	Mass.	150,000	100	5	January & July.	20,000	3 00	....	....	
1859	Rutland	Vt.	20,000	25	—	Do.	4,000	3 50	....	....	
	Saco	Me.	71,600	100	3½	April & October.	8,000	4 00	....	....	
1857	Sacramento	Cal.	500,000	100	—	Do.	40,000	10 00	....	....	
1859	Sag Harbor	N. Y.	20,000	—	—	Do.	4,000	4 00	....	....	
1858	Saint Albans	Vt.	15,000	20	—	Do.	3,000	7 00	....	....	
	Saint Johnsbury	Vt.	30,000	25	—	Do.	4,000	4 00	....	....	
1857	Saint Joseph	Mo.	50,000	100	5	January & July.	6,000	5 00	....	....	
1859	Saint Louis	Mo.	600,000	50	—	June & December.	180,000	3 50	....	....	
1857	Saint Paul	Min.	200,000	50	3	January & July.	10,000	6 00	....	....	Surplus $10,000, May 15, 1863.
1856	Salem	N. J.	30,000	25	3	Do.	5,000	3 86	....	....	
1850	Salem	Mass.	200,000	100	4	February & August.	30,000	3 24	....	....	
1859	Salem	O.	25,000	20	—	Do.	3,000	3 00	....	....	
1859	Salisbury	N. C.	14,800	50	6	May & November.	3,500	6 00	....	....	
	Salisbury Mills	Mass.	1,250	25	—	Do.	3,000	4 00	....	....	
	Salmon Falls	Me.	25,000	100	—	Do.	3,000	4 00	....	....	
	San Antonio	Texas.	75,000	20	—	Do.	40,000	6 00	....	....	
1854	Sandusey	O.	75,000	50	—	April & October.	9,000	3 00	....	....	
1850	Sandwich	Mass.	10,000	—	—	Private Works.	2,000	3 50	....	....	
1852	San Francisco	Cal.	2,000,000	100	4½	Do.	100,000	6 50	100	....	
	San Jose	Cal.							....	....	
1853	Saratoga Springs	N. Y.	39,000	100	—	January & July.	6,000	3 60	70	....	
	Saugerties	N. Y.	30,000	20	—	Do.	4,000	3 00	....	....	
1849	Savannah	Ga.	200,000	25	5	Do.	10,000	3 75	....	....	
1851	Schenectady	N. Y.	50,000	—	—	Private Works.	11,000	4 00	....	....	
1858	Scranton, Gas and Water.	Pa.	100,000	25	—	January & July.	6,000	3 80	....	....	About trying Water-Gas.
1857	Selma	Ala.	20,000	100	—	Do.	2,000	5 00	....	....	
1856	Seneca Falls and Waterloo	N. Y.	80,000	50	3	Do.	10,000	4 00	100	....	
	Shreveport	La.	40,000	25	—	Do.	3,000	0 50	....	....	
1856	Sing Sing	N. Y.	40,000	100	—	Do.	3,000	3 50	....	....	
	Smyrna	Del.						4 00	....	....	Petroleum Gas.
1860	South Adams	Mass.	10,000	25	—	Do.	3,000	4 00	....	....	
1859	South Bridge	Mass.	5,000	25	—	Do.	4,010	6 00	....	....	
	South Boston	Mass.	200,000	50	—	Do.	60,000	3 25	110	....	
	Springfield	O.	200,000	100	—	Do	20,000	3 50	....	....	
1854	Springfield	Ill.	75,000	50	—	January & July.	10,000	3 50	....	....	
1848	Springfield	Mass.	100,000	500	5	February & August.	10,000	3 60	140	....	
1855	Stamford	Ct.	6,250	25	5	April & October.	3,000	3 50	....	....	
1857	Staten Islan	N. Y.	150,000	50	5	January & July.	26,000	4 00	95	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
18	Staunton	Va.	18,000	50	6	January & July.	4,000	7 00	....	....	
	Steubenville	O.	150,000	100	—	Do.	15,000	4 00	....	....	
	Stockton	Cal.	50,000	—	—	Do.	8,000	10 00	....	....	
1848	Syracuse	N. Y.	125,000	25	5	March & September.	25,000	3 00	112	....	
	Tamaqua	Pa.	40,000	25	—	Do.	3,000	4 00	...	....	
1859	Tarrytown and Irvington	N. Y.	70,000	50	—	January & July.	3,000	4 00	....	....	
1853	Taunton	Mass.	100,000	50	4	Do.	10,000	4 00	....	....	
	Terre Haute	Ind.	100,000	100	—	Do.	3,000	4 00	....	....	
	Thompsonville	Ct.	25,000	50	—	Do.	4,000	4 50	....	....	
	Tiffin	O.	25,000	20	—	Do.	4,000	4 00	....	....	
1853	Toledo	O.	100,000	50	3	Do.	8,000	3 50	....	....	
1847	Trenton	N. J.	100,000	20	4	Do.	15,000	3 42	....	110	
1848	Troy	N. Y.	200,000	100	4	June & December.	85,000	3 00	160	....	
1856	Urbana	O.	30,000	25	—	April & October.	3,500	4 00	....	....	
1849	Utica	N. Y.	80,000	100	4	Do.	22,000	3 60	....	....	
1853	Vicksburg	Miss.	66,000	50	—	March & September.	4,000	4 50	....	....	
1859	Vincennes	Ind.	25,000	100	—	January & July.	2,000	4 00	....	....	
1863	Virginia City.	N. T.					20,000				
1858	Walden	N. Y.	2,500	—	—	Private Works.	1,000	6 00	....	....	
1858	Waltham	Mass.	100,000	100	4	January & July.	3,000	4 00	....	...	
1857	Ware	Mass.	30,000	20	—	Do.	3,500	4 00	....	....	
1861	Warren	O.	30,000	50	—	Do.	4,000	3 00	....	....	
1854	Warren	R. I.	20,000	25	—	Do.	3,000	4 00	....	....	
1855	Washington	D. C.	500,000	20	5	Do.	50,000	2 61	....	100	
1859	Washington	N. C.	15,000	100	—	April & October.	1,500	6 00	....	....	
1848	Washington	Pa.	20,000	25	4	January & July.	4,000	3 00	....	....	
1854	Waterbury	Ct.	100,000	25	—	Do.	4,000	4 00	....	....	
1852	Waterford	N. Y.	12,000	25	—	Do.	4,000	4 00	....	....	
1852	Watertown	N. Y.	20,000	100	—	Do.	10,000	7 00	....	....	
1856	Watertown	Wis.	25,000	100	—	Do.	5,000	5 00	....	....	
1858	Wautoma	Wis.	30,000	50	—	Do.	3,000	4 50	....	....	
1857	Waverly	Miss.	20,000	100	—	April & October.	4,000	5 00	....	....	
1854	West Cambridge	Mass.	60,000	100	—	February & August.	10,000	4 00	....	....	
1852	Westchester	Pa.	100,000	25	2½	Do.	3,500	3 50	....	....	
	Westfield	Mass.	25,000	100	6	Do.	4,000	4 00	....	....	
	Weston	O.	20,000	25	—	Do.		5 00	....	....	
1857	West Point	N. Y.	50,000	—	—	United States Military	Academy.	2 00	....	....	
1858	West Troy	N. Y.	100,000	50	3	January & July.	10,000	3 60	85	....	
1850	Wheeling	Va.	75,000	25	6	Do.	12,000	2 70	....	....	
	White Plains	N. Y.	20,000	20	—	Do.			....	....	
1856	Wilkesbarre	Pa.	50,000	50	—	May & November.	4,000	3 33	100	80	
1850	Williamsburg	N. Y.	1,000,000	50	5	January & July.	60,000	3 00	....	....	
1858	Williamsburg	Va.	30,000	25	—	Do.	3,000	4 00	....	....	Camp-fires of the Union Army light up this place at present.
1857	Williamsport	Pa.	70,000	25	4	Do.	8,500	3 80	....	....	
1859	Willimantic	Ct.	12,000	—	—	Do.	2,500	3 50	....	....	
1853	Wilmington	N. C.	60,000	50	5	Do.	8,000	5 00	....	....	
1852	Wilmington	Del.	200,000	50	5	February & August.	20,000	3 00	....	....	
1854	Winchester	Va.	36,000	50	6	January & July.	5,000	4 00	....	....	
1861	Windsor	Vt.	20,000	25		Do.	2,000	6 00			Make Petroleum Gas.
	Woburn	Mass.	20,000	—	—	Do.	3,000	4 00	....	....	
1856	Woodstock	Vt.	10,000	50	4	Do.	4,000	6 00	....	....	
1853	Woonsocket	R. I.	82,600	100	4	April & October.	4,000	3 50	....	....	
1856	Wooster	O.	25,000	50	—	January & July.	6 000	3 00	....	....	
1849	Worcester	Mass.	160,000	100	5	Do.	15,000	3 50	....	....	
1855	Xenia	O.	40,000	50	—	Do.	3,000	4 00	....	....	
1854	Yonkers	N. Y.	100,000	50	3½	Do.	10,000	3 50	110	104	
1849	York	Pa.	40,000	57	3	June & December.	10,000	3 50	....	....	
	Yorkville	S. C.	20,000	25	—	Do.	4,000	4 00	....	....	
1858	Ypsilanti	Mich.	20,000	50	5	February & August	6 000	14 00	....	....	
1850	Yreka	Cal.	30,000	100	—	Do.	2,000	0 00	....	....	
1848	Zanesville	O.	44,600	25	4	Do.	10,000	3 00	....	..	

GAS-LIGHT COMPANIES IN THE BRITISH PROVINCES OF NORTH AMERICA.

When Chartered.	Town.	Province	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1854	Belleville	C. W.	33,040	100	4	January & July.	1,200	5 00	....	....	
1854	Brantford	C. W.	32,000	100	2½	Do.			....	....	
	Brockville	C. W.	50,000	—	—	Do.	5,000	4 00	....	....	
	Chatham	N. B.	50,000	—	—				....	....	
1854	Charlotte Town	P. E. I.	50,000	100	5	Do.	3,000	3 50	....	....	
1857	Cobourg	C. W.	30,000	—		February & August.	4,000		....	....	
	Dundas	C. W.	30,000	—	—	Do.	6,000	4 00	....	....	
	Frederick	N. B.	50,000	—	—	Do.			....	....	
1843	Halifax	N. S.	160,000	40	7	May.	20,000	3 60	....	....	
1850	Hamilton	C. W.	125,000	40	5	March & September.	20,000	3 50	....	....	
1848	Kingston	C. W.	80,000	100	—	Do.	6,000	3 50	....	....	
1853	London	C. W.	100,000	20	5	May & November.	5,000	5 00	....	....	
1847	Montreal	C. E.	400,000	40	—	March & September.	110,000	2 80	....	113	Last sale at this figure.
1854	Ottawa	C. W.	40,000	40	5	Do.	5,000	4 50	....	....	
1859	Point Levi	C. E.	25,000	25	—	January & July.	4,000	3 50	....	....	
1859	Port Hope	C. W.	28,000	20	4	May & November.	4,500	3 50	....	....	
1847	Quebec	C. E.	200,000	200	4	January & July.	60,000	3 00	....	....	
1848	Saint Catherine's	C. W.	80,000	20	—	May & November.	7,000	4 50	....	....	
1859	Saint Hyacinthe	C. E.	15,000	20	—	Do.	4,000	4 00	....	....	
	Saint John	N. B.	170,000	85	4	June & December.	25,000	3 00	110	110	Sales at this figure.
	Saint John's	N. F.	50,000	—	4	Do.	30,000		....	....	
1858	Sorel	C. E.	14,000	20	4	Do.	4,000	3 00	....	....	
1848	Toronto	C. W.	400,000	50	—		50,000	3 00	....	....	This Co. pay a quarterly div. of 2 per ct.

GAS-LIGHT COMPANIES IN CUBA, MEXICO, SOUTH AMERICA AND NEW ZEALAND.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
	Callao	Chile.		—	—	January & July.	20,000	7 00	....	....	
	Cardenas	Cuba.	50,000	—	—	Do.	180,000	5 00	....	....	
1857	Compania Cubana	Hav'a.	500,000	500	10	Do.			....	....	
	Cienfugos	Cuba.		—	—	Do.	12,000	5 00	....	....	These four towns are lighted by the Compania Cubana of Havana.
	Guanabacoa	Cuba.		—	—	Do.	14,000	5 50	....	....	
	Regla	Cuba.		—	—	Do.	10,000	5 00	....	....	
	Trinidad	Cuba.		—	—	Do.	16,000	5 00	....	....	
	Guines	Cuba.		—	—	Do.			....	....	
	Guyaquil	S. A.	150,000	—	—	Do.	85,000		....	....	
	Havana	Cuba.	2,000,000	500	—	Quarterly.	200,000	5 00	....	175	
	Lima	Peru.	100,000	—	—	January & July.	150,000		...	....	
	Maranham (Chartered)			—	—	Do.			....	....	
	Matanzas	Cuba.	50,000	—	—	Do.	180,000	8 50	....	....	
	Mexico City	Mex.	550,000	—	—	Do.			....	....	
	Montevirdo	S. A.	500,000	—	—	Do.			....	....	
	Para (Chartered)			—	—	Do.			.. ..	....	
1854	Rio de Janeiro	S. A.	1,000,000	500	7½	Do.	300,000	4 00	...	....	
	San Iago	Chile.	500,000	—	—	Do.	180,000	7 00	....	...	
1857	Saint Jago de Cuba	Cuba.	450,000	500	—	Do.	25,000	5 00	....	....	
	Valparaiso	Chile.	500,000	—	—	Do.	85,000	6 00	.. ..	....	
	Vera Cruz	Mex	500,000	—	—	Do.			....	....	
	Vi le Clara	Cuba.	50,000	—	—	Do.			....	....	
	Auckland	N. Z.		—	—	Do.			....	....	

WATER WORKS OF AMERICA.

WILMINGTON, DEL.

REPORT OF THE WATERING COMMITTEE.

To the City Council of Wilmington:

The Watering Committee, to whom was referred the subject of having a proper analasis of the Brandywine water made, submit the following report:

The subject was referred to the committee on the 15th of October. This was before the fall rains set in, and on the next day we made every effort to get the necessary samples of the water; but about noon it commenced raining very hard. This, and other rains which succeeded, prevented us from getting the samples until the 7th of November; on that day, John Downing filled two demijohns from the Brandywine Creek, above Jessup & Moore's upper mill (formerly Young's). On the same day, Aquilla Pritchard filled two others from the hydrant at his house, corner of Tenth and Market streets; two more were filled by Madison Heck, on the same day, out of the race at Brandywine Mills, in this city; but, owing to the water being without the objectionable appearance in the race until the 14th of November, the demijohns were all detained until said 14th, when the two latter were emptied and refilled by the same person, from the same place, at this time. It was believed by the committee that the water taken from the hydrant at the house, corner of Tenth and Market streets, would be a fair average of the kind of water used by the citizens; said hydrant being connected with the main pipe in Market street, from which main pipe nearly the whole city is supplied.

The demijohns would hold about five gallons each. They and the corks were new and perfectly clean The water was perfectly clear, and without any appearance of mud or other impurities from rain, and the samples were taken with a view solely to obtain a fair and truthful analysis of the Brandywine water from the three different points mentioned, to wit: Jessup & Moore's upper dam, A., Pritchard's hydrant, and the race at the Brandywine Mills (when the water in the race had the worst appearance). The demijohns had small marks put upon them before filling, which, after being filled, were covered by the letters, *P*, *T*, and *O*, privately, by the Chairman of your committee, in order that he might be able to tell where each kind belonged, and that no other person could know where the separate samples came from.

You will observe that two samples were taken at each place. One demijohn, filled from Jessup & Moore's upper dam, one filled from A. Pritchard's hydrant, and one filled out of the Brandywine race in this city, were sent by Adams' Express to Prof. William E. A. Aikin, Baltimore.

One demijohn filled from each place, as above, were sent to Booth & Garret, Philadelphia. These samples, taken, as they were, two at a place on the same day, to go to different chemists, it was expected that the analysis would not differ much one from the other; but, owing to an accident, or some other cause, one of them got broken in Philadelphia, which was replaced, on the 4th of December, from the same place, to wit: Jessup & Moore's upper dam. The first were all filled seven days after a rain, and the latter to replace the broken one only six days after. Neither rain was of much consequence, as they riled the water but little.

Prof. William E. A. Aikin was recommended to your committee by Mr. Suter, Chief Engineer of the Baltimore Water Department, as being the best analytical chemist in that city, and very suitable to make the examination we required.

Booth & Garret's analysis of the Schuylkill and Delaware river waters, for the city of Philadelphia, recommended said firm to the committee. These chemists were chosen by us, notwithstanding, and with all due deference to opinions entertained by some of our citizens, that some others were more competent to do the work required. We have been thus minute in order to show the council and citizens that the committee have lost no time, except that necessarily lost on account of rains, in procuring and forwarding to the parties the different samples of the water.

The following is the explanation of the marks: The demijohns marked *P* were filled from Jessup & Moore's upper dam; those marked *T* were filled from the Brandywine Race, in this city (when the water looked very badly); and those marked *O* were filled from A. Pritchard's hydrant.

The committee present the following communication received from Prof. Aikin, Baltimore, on the 21st December, 1863:

*Prof. Aikin's Analysis.**

BALTIMORE, DEC. 19th, 1869.

J. M. Pusey, Esq., Chairman, &c.:

Dear Sir,—In compliance with your instructions, I have completed a careful analysis of the three samples of water forwarded to me, marked, respectively, *P*, *T*, and *O*, and below give you the results, in tabular form, for the convenience of comparison. In physical characteristics they were all equally clear and bright, tasteless, inodorous, and colorless, with the exception that *T* showed a very slight brownish tint when viewed in large mass upon a white background. One gallon (imperial of 70,000 grs.) of each water was carefully evaporated to obtain the solid contents, organic matter, silicic acid, &c., and a preliminary qualitative analysis having indicated the character of the acids and bases present, separate parcels of each water were subsequently employed to determine the exact proportion of each separate constituent. The substances found were sulphuric acid, carbonic acid, silicic acid chlorine, lime, soda, magnesia, alumina, potassa, iron, manganese, and organic matter. The alumina, potassa, iron and manganese, are present in mere traces, in quantities too minute to be expressed by weight When it is recollected that a good balance will turn with the one thousandth part of a grain, the actual quantity of these substances may be safely considered as unimportant. The acids and bases above enumerated, when arranged in their natural combinations representing the compounds in solution in the natural waters, will give us a comparative view of the three samples. The weights are expressed in grains and decimals, and represent the proportion of each constituent in an imperial gallon:

CONTENTS OF ONE IMPERIAL GALLON OF 70,000 GRAINS.

	P.	T.	O.
Sulphate of lime.....	.450 gr.	.440 gr.	.448 gr.
Carbonate of magnesia...	.395	.390	.357
Carbonate of lime.....	1.523	1.500	1.520
Carbonate of soda.....	.230	.245	.240
Chloride of sodium.....	.410	.420	.418
Chloride of magnesium...	.120	.150	.141
Chloride of calcium	.162	.274	.265
Silicic acid	.130	.156	.154
Potassa	0.30	.033	.033
Alumina.....			
Manganese			
Iron and loss.....			
Total mineral contents...	3.450	3.608	3.576
Organic matter	1.100	2 110	1.200
Total solid contents.....	4.550	5.718	4.866
Specific gravity	1000.12	1000.27	1000.19

As the imperial gallon is to the ordinary or wine gallon as 30 is to 36, we may deduct 1-6 of the above weights to get the per centage of each constituent, as contained in the ordinary gallon, as follows:

CONTENTS OF ONE WINE GALLON OF 231 CUBIC INCHES.

	P.	T.	O.
Total mineral contents...	2.875 gr.	3.007 gr.	2.980 gr.
Organic matter.....	.917	1.759	1.075
Total solid contents.....	3.792	4.766	4 055

We thus find that these waters compare very favorably with the water supply of Baltimore, Philadelphia, and New York.

COMPARATIVE TABLE.

	Mineral Contents.	Organic Matter.	Total.
Croton, N. Y.	2.675	.940	3.705
Fairmount, Phila.....			5.500
Jones' Falls, Balt.....	3.870	1.530	5 400
Wilmington, Del.....P	2.875	.917	3.792
" " .....T	3.007	1.759	4.766
" " .....O	2.980	1.075	4.055

This small per centage of mineral contents must give value to these waters for use in steam-boilers. The boiler crust they could supply must be very small, and their difference in value in this respect may be represented by the trifling difference between them in the weight of mineral contents per gallon.

The action of the waters upon metallic lead was sought by exposing a surface of some twelve square inches in two pints of water freely exposed to the air for the space of five days. At the expiration of that time, the difference in the weight of the lead was noted, and the same pieces were again exposed in the same manner for an equal period, in contact with fresh quantities of the same waters. At the end of the second term the weight was again noted, and the pieces again replaced as before. At the end of the third term the weight had become stationary, indicating the cessation of chemical action. This action consists in the deposition of an insoluble sub-oxide of lead on the surface of the metal, which coat subsequently combining with the sulphuric and carbonic acids of the salts in solution, and with a part of the organic matter, and any iron present speedily supplies an impermeable protecting coat for the interior of all leaden service-pipes used in conveying the water. The residual water was carefully examined for traces of lead, but no appreciable quantity could be detected. Hence we may conclude that all three samples of water may be considered as perfectly safe for use when served through leaden pipes. The relative action of the several samples on the lead surface was as follows, in decimals of a grain:

	P.	T.	O.
Deposited during 1st 5 days....	.00017	.00019	.00020
" " 2d 5 "	.00004	.00005	.00003
" " 3d 5 "	.00000	.00000	.00000
Total deposited in 10 days	.00021	.00024	.00023

To determine the degree of hardness, the volumetric method of Dr. Clark was employed. By using a graduated alcoholic solution of soap, previously verified by trial, with a calcareous solution of known strength, each degree expressing the hardness of any water, corresponds very nearly with one grain of carbonate of lime, or its equivalent of any other calcareous or magnesian salt, in solution in an imperial gallon. This exact relation is, however, somewhat disturbed when calcareous and magnesian salts are associated together as in these waters. The temporary hardness is that exhibited by water in its natural state. The permanent hardness is that exhibited by the same water from which the earthy salts have been in great part separated by boiling.

I have no data to enable me to compare these waters in this respect with the water supply of any of the neighboring cities, except Baltimore, with that which, I believe, is unexceptionable in this regard, the difference is as follows:

	P.	T.	O.	Baltimore.
Temporary hardness....	2°.260	2°.695	2°.478	2°.500
Permanent hardness	2° 030	2°.510	2°.245	2°.870

The difference in the value of these waters for certain manufacturing purposes, as indicated by their difference in hardness, may be readily approximated. According to Dr. Clark, each degree of hardness involves the loss, by decomposition, of two ounces of soap for every hundred gallons of water employed before any detergent action can be obtained. Then, for each hundred gallons of these waters in their natural state, the loss of soap would be in ounces and decimals avoirdupois, as follows:

LOSS OF SOAP FOR 100 GALLONS OF WATER USED.

P.	T.	O.	Baltimore.
oz 4.519	oz. 5.391	oz. 4.956	oz. 5.000

The greatest difference between the samples of water, as shown by my analysis, is manifest in the different quantities of organic matter present. The microscope showed very nearly the same vegetable and animal *debris* in all three samples, but somewhat less abundant in *T* than in either of the others. The forms in *O* and *T* were more nearly identical, and differed more widely from those of *P* than from each other. Diatoms were more abundant in *P*, with but few animal remains; *O* showed but few diatoms, with more animal remains; and *T* was very similar to the last, with fewer animal remains.

My investigations in these matters, I may remark, were fully confirmed by my friend Christopher Johnson, M. D., of this city, to whom I submitted a portion of each sample. And I would beg leave here to acknowledge my indebtedness, on more than one occasion, to his well-known skill and experience as a microscopist. The action of a solution of permanganate of potassa showed unequivocally the presence of a much larger proportion of oxidizable or putrescible

* A detailed statement of the method of analysis pursued by Professor Aikin will be found in another part of this paper.

organic matter in *T*, when contrasted with *O* and *P*. This difference would be quite intelligible if *T* should be found exposed to any contamination that could supply soluble organic matter. A definite solution of the permanganate, containing half a grain to one fluid ounce of water was used, and the relative volumes required to color permanently for a half hour, equal bulks of the three waters, 1,000 grains measured of each, was noted. The relative volumes of the solution required for this purpose were as follows:

P.	T.	O.
1	2.125	1.25

The difference between this expression and that supplied by analysis, can only be referred to the fact that this reagent acts upon everything oxidizable or putrescible in the water in its natural state. Chemical analysis gives the absolute weight of all organic matters left unchanged at the temperature of boiling water. The conclusions that would seem to be indicated by the foregoing results may be summed up as follows:

1st. The water *P* appears to be a very superior water for domestic and manufacturing purposes.

2d. The water *O* may be considered as practically very little inferior, and either of these ought to satisfy the most fastidious.

3d. The water *T* is slightly inferior, and, if convenient, should be excluded, although many large communities in our day might be glad to exchange their daily supply for this, even with its objectionable features.

In conclusion, I would merely state that all foreign matters found in natural waters are not necessarily impurities. If chemically pure water could be found, it might be better fitted for some manufacturing purposes, but we may well doubt whether it would be fit for ordinary use. The salts usually present in the best natural waters contain principles that are indispensable for the healthy action of the animal system. The two substances most widely distributed and most constantly present—the carbonate of lime and the chloride of sodium, are well calculated to supply important elements to the living body; and it requires no great stretch of imagination to suppose that these substances have been thus provided, in part, at least, for such purposes. Respectfully, &c.,

WILLIAM E. A. AIKIN.

The committee also present the following communication received from Messrs. Booth & Garrett, Philadelphia, on February 2d, 1864:

Analyses of Booth & Garrett.

We herewith present our report on the analyses of the three waters, which you submitted to us for the purpose in November last. The vessels containing the waters were marked *O*, *T*, and *P*, respectively, and as we have no knowledge of the signification of those letters, we present the precise results of our analyses, and general remarks on them, without knowing the object you have in view, except that it has some reference to their use in household economy.

The following table, No. 1, gives the direct results of analysis, expressed in grains or fractions of a grain, of the mineral and organic matter, contained in the United States wine gallon, all the substances named being regarded as in the dry or anhydrous condition:

TABLE I.—DIRECT ANALYSIS.

Names of Substances.	P.	O.	T.
Soda	0.446	0.880	0.846
Lime	0.698	0.583	0.912
Magnesia	0.320	0.490	0.409
Protoxide of iron	0.051	0.068	0.051
Sulphuric acid	0.305	0.825	0.318
Chlorine	0.174	0.265	0.225
Silica	0.788	0.662	0.795
Organic matter	0.727	0.142	1.159

To render these results more intelligible to some ersons, we now present Table 2, calculated from the esults of No. 1, with the following remarks: We have combined all the suphuric acid with the lime, and all the chlorine with sodium, making sulphate of lime (plaster of Paris) and chloride of sodium, (common salt). The balance of soda and lime, together with all the magnesia, are either wholly or almost entirely combined with carbonic acid, as we determined by qualitative experiment. It is quite probable that a small portion of these bases is united with an organic acid, and it may be with silica, acting as an acid; but to have attempted even an approximate determination of this point would have demanded a large expenditure of time, and would not, moreover, have resulted in any conclusion of practical utility. We ascertained that nitric acid was not present in appreciable quantity. We ascertained that the alkali in the waters was soda, with the exception of mere traces of potash in the water marked *O*. We have, therefore, not hesitated to regard it all as soda. We did not deem it necessary to notice the alumina contained in the oxide of iron, because the whole of the latter is very small, and the former is infinitessimal.

TABLE II.—RATIONAL ANALYSIS.

	P.	O.	T.
Chloride of sodium	0.287	0.436	0.371
Sulphate of lime	0.518	0.550	1.540
Carbonate of soda	0.503	0.255	0.256
" " lime	0.697	0.686	0.231
" " magnesia	0.671	0.818	0.858
Protoxide of iron	0.051	0.068	0.051
Silica	0.788	0.662	0.795
Organic matter	0.727	1.142	1.159
Residue by calculation	4.192	4.567	5.261
Residue by determination	4.087	4.541	4.805

When it is remembered that we have supposed all the bases, soda, lime and magnesia (not united with sulphuric acid and chlorine) to be combined with carbonic acid, when a portion is probably otherwise combined, it will be at once evident that the numbers of the calculated residue, and of that directly determined, confirm each other with sufficient closeness, and therefore confirm the analyses.

In order to give a still clearer view of the relative composition of the waters, we now throw together, in Table III., those substances of a similar character, and condense the figures. In order still further to institute a comparison, we append the results of analysis of the Delaware river, from near Tacony, above Philadelphia. We have taken the Delaware water at this point, because, although its composition is influenced by the drainage of this city, yet it is less so than the water nearer to the city.

TABLE III.—SUMMARY OF RESULTS.

	P.	O.	T.	Delaware River.
Salts of soda	0.79	0.60	0.63	0 23
Salts of lime and magnesia	1.89	2.00	2.63	2 16
Silex	0.74	0.66	0.79	0.16
Organic matter	0.73	1.14	1.16	1.03
Total of mineral matter	3.42	3.35	4.05	2.55
Do. of organic matter	0.73	1.14	1.16	1 03

Conclusions.—We observe, first, that the total amount of residue per gallon is not great in all three of the waters, being from about 4½ to 5½ grains, and in this respect it is superior to the Schuylkill water, and scarcely inferior to that of the Delaware, which is about 3½ grains per gallon, at Tacony, while the Schuylkill, at Philadelphia, has not less than 7 grains.

If we compare the residues of the three waters, given at the foot of Table II., we observe the difference in solid contents to be 4 grains in *P*, 4½ in *O*, and 5¼ in *T*. The difference of 1¼ grain per gallon between the extremes *P* and *T* is in itself very slight, provided the nature of the difference do not affect the conclusion. By examining the summary in Table III., we notice that there is no important difference between the three waters in the salts of soda, nor in the silica. The greatest difference is in the salts of lime and magnesia, *T* containing three-fourths of a grain in excess of the lowest *P*; and Table II. shows that the latter contains over half a grain more of carbonate of lime, which is the chief cause of the difference. But that this difference is unimportant is evident, from the fact of experience, that the whole quantity of the salts of lime and magnesia is an unimportant amount; for the Schuylkill water from Fairmount to Valley Forge contains between 4 and 5 grains of these same salts, and yet the water is not objected to on that account. Moreover, while the amount of these salts is nearly twice as great in the Schuylkill, yet further, more than one-half of the amount in the Schuylkill is sulphate of lime (2.6 grains), while only one-fourth of it, or less, is contained in the three waters; therefore, all three of them are superior to the Schuylkill in this respect, for sulphate of lime is the main cause of a deposit being formed in and adhering to steam-boilers, and is also the main cause of the curdling of soap in our waters.

The most important difference in the composition of the three waters is the content of organic matter, in which those marked *O* and *T* exceed that termed *P* by half a grain, or nearly so. If we are to give an opinion on the waters, chiefly as to their adaptation to household use, we would in this respect much prefer the water *P*, because every additional fraction of a grain renders a water more liable to putrefaction. During putrefaction, offensive gaseous matter is evolved, and, according to medical opinion, such water would be insalubrious. While the amount of organic matter in *O* and *T* is sensibly the same, it exceeds that in *P* by fifty per cent., and therefore the two waters, *O* and *T*, are to that extent inferior to *P*. But, while thus expressing an opinion on the comparative qualities of the three waters, we cannot condemn *O* and *T* as unfit for domestic use; we merely say we would prefer that marked *P*. When we were called upon to institute a comparison between the waters of the Delaware and Schuylkill rivers, at Philadelphia, more than a year ago, we pronounced, unhesitatingly, in favor of the Schuylkill, because it was almost wholly free from organic matter, wherens the Delaware contained a grain of such matter, even at the distance of Tacony from Philadelphia. (See Table III.)

In conclusion, according to our analyses of the three waters, marked *P*, *O*, and *T*, they may all be employed in domestic economy, but the first is superior to the other two by an important difference in the content of organic matter, and therefore greatly to be preferred. For manufacturing purposes, such as a generation of steam, &c., all three are excellent waters, with a slight shade of difference in favor of that marked *P*.

Respectfully, your obedient servants,

BOOTH & GARRETT.

All of which is respectfully submitted by the Committee.

J. M. PUSEY,
ABM. BOYS,
E. J. HORNER,
G. CHANDLER,
PHILIP PLUNKETT,
} Watering Committee.

PETROLEUM IN MICHIGAN.—The petroleum fever is beginning to rage with considerable violence in Michigan, and capitalists are about investing money in the prosecution of explorations. The Detroit *Free Press* thus refers to the discoveries which have been made.

Since the discovery of oil at Albion was made known, other and similar oil springs have appeared in various localities of this State. Mention has already been made in the *Free Press* of the oil springs at Paw Paw, Van Buren county. The fact has also been noticed to these columns that petroleum springs have been discovered in Washtenaw county. Among other localities, oil has made its appearance upon a spring belonging to a farm of Patrick Dolan, a mile and a half north of Dexter. A large amount of oil has flowed from this spring. Upon the farm of the late Judge Dexter, adjoining the the village of Dexter, an oil spring has been known to exist for some years, but no particular attention was paid to the matter, till the recent oil excitement broke out in this State. Seventy acres of land containing this oil spring have recently been sold at a handsome figure, and explorations will be commenced at an early day.

At Niles, in Berrien county, on the line of the Michigan Central Railroad, still west of Albion, oil springs have recently been discovered. At one spring, a half mile out of the city, the flow of oil is quite large.

These facts and incidents of themselves are perhaps unimportant. But we deem them significant, as bearing upon the general fact of the existence of oil-bearing rocks in the State. It is gratifying to know that intelligent capitalists of New York and other States, assisted by those of Michigan, have fully determined to give this matter a full and thorough investigation.

NATURAL GAS IN PENNSYLVANIA.—Near Scranton, Pa., there is said to be a place where natural gas, in large quantities, exudes from the rocks. It has been proposed to gather this gas in holders, and supply the town. The town of Fredonia, N. Y., derives its entire supply of gas from this source, and it is said to give great satisfaction.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

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Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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THE AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, ... EDITOR.

MONDAY, MAY 2, 1864.

It will be seen by an article in another column, copied from the *Sanitary Reporter*, that the gas-engineers in London are experiencing another one of those excitements and disputes, which so frequently happen in the English metropolis. It may almost be said that contention and strife are inseparable from progress in gas-lighting. In almost every instance where great changes are proposed, the different sides of the questions involved will have their partisans, and the enmity of these self-selected advocates to the views of their opponents not only brings about a bitterness of professional strife, but, in many cases, this bitterness is extended, and begets personal animosity and abuse.

The gas experts of London have been having a professional broil over the so-called Parliamentary gas-burner for testing the illuminating power of coal-gas. As our contemporary presents the whole matter in the article referred to, we will not more than allude to it here. A perusal of it will show the extreme difficulty of prescribing a law which may not be virtually broken at the will of anyone wishing to violate its provisions. That is to say, although the letter of the law may be complied with, as seems to be the case with the burners referred to, yet the spirit of the act appears to have been wholly departed from, and burners adopted by the examining officers, which were really no criteria of the illuminating power of the gas consumed.

The *Sanitary Reporter*, which always stands up for the rights of the consumer, and against the aggressions of monopolies, lays great stress upon the imposition practised upon consumers, by the adoption of the Sugg burner. If the difference be as great as is alleged, it amounts to a serious matter; and if the allegations be sustained, Parliament will undoubtedly be called upon to define more particularly what shall be the standard burner. The ingenuity of those who wish to evade a law of this kind is very great, and unless the details be given, and the dimensions of the burner be stated with great minuteness and accuracy, trivial alterations may be made which vitiate the whole principle of the act, while apparently complying with its provisions.

In the evidence adduced to prove the unfairness of the present method of testing gas in London, we notice a wide difference in the testimony of some of the scientific men whose opinions were sought. In this case, as in many others, the divergence of these witnesses was very great, and suggests a state of affairs by no means pleasing, regarding the manner in which these London *savants* trade their opinions in questions where they are examined as experts. We had occasion, recently, to allude to this subject while commenting on the case of YOUNGS *vs.* FERNIE, the great coal oil case which has been recently tried in England. In this case, we observed the names of some of the greatest chemists of England, whose reputations are world-wide, arranged, some on the side of the plaintiff, and some on the side of the defendant. If chemical experts were open to engagements for either side of a cause, and were expected to advocate the side belonging to the party which offers the best pay—or, in other words, to act as lawyers, and make a good case out of a poor one, if possible—this display of scientific skill on opposite sides would be creditable. But, where plain facts only are to be dealt with; and the undeviating laws of chemistry and other sciences explained, it is, to say the least of it, a singular sight to see men, whose training should make them think alike, arrayed on opposite sides, and doing all in their power to damage each other's testimony.

The books of subscription to the capital stock of the "Anthracite Gas-Lighting and Heating Company," have been opened since our last issue, and we believe a large number of shares have been taken. The large premium which New York, Manhattan, and Metropolitan gas stocks, bring in the market, and the fact that the new company has as good a chance of success as any of the older ones, has led capitalists to look with some degree of favor upon the proposed undertaking.

It is said that the opposition gas company of Washington, D. C., will soon have their works in progress of construction. This company seem to be made up of patent arrangements They will use a patent water gas process, and patent bituminized pipes—neither of which have been tested on a scale sufficient to warrant their success. This company are bound in their charter by provisions which restrict them to a low price, and are obliged to make gas of a high degree of illuminating power. As the present gas company of Washington were compelled to pass their dividend, we think there is very little encouragement for capitalists to go into an opposition company in that city. In New York the case is different. The existing companies pay very large dividends, and there is every reason to believe that new companies would stand a very fair chance of success.

LENOIR GAS ENGINE.—We are happy to announce the arrival in this city of two Lenoir Gas Engines—one of half-horse, and one of two-and-a-half horse power.

They will be set up in a few days, when notice will be given to all interested to see them in operation. By a letter from one of our correspondents in England, published to-day, we observe that this motor is about being introduced there.

BALTIMORE, MD.—The laborers at the Baltimore Gas Works recently struck for higher wages, and refused to work unless their demands were acceded to. The military governor, hearing of this, marched a squad of contraband soldiers to the works for the purpose of installing them in the places of the disappointed Milesian operatives. As Paddy and Sambo can never pull together, and are not likely to afford a practical example of "miscegenation," the former operatives had their dignity so deeply offended at the idea of being replaced by the darkies, that on a second sober thought, they resumed work with unwonted alacrity, thus relieving the colored gentlemen from the necessity of soiling their delicate complexions by the smoke and dust of the retort house.

GAS COAL.—We hear of the proposed organization of several new coal companies in Pennsylvania and elsewhere. Coal is unprecedentedly high, and the formation of new companies would tend to increase the supply and lessen the price.

CORRESPONDENCE.

GOSSIP FROM ENGLAND.

——— England, March 31, 1864.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

This, the last day of March, the long, cold, dark, stormy winter, is not come to an end. Although it is "reported" that the nightingale and the cuckoo have both been heard, and, if so, much earlier than usual, we will have sharp, biting, east and north-east winds, with snow and hail. We must be patient. All will come right.

Gas-managers have their hands full during winter. With the return of spring many of them have a change of occupation, with an increase of anxiety. Alterations and extensions are required, and must be hastened forward. It is a mere exception, if a large concern does not every year require to be made larger; and rarer still that the work is completed in proper time. Among all our manufacturing processes, not one requires such constant attention, in seasonal preparations, as gas-making. There is always something doing; and always something more to be done. No wonder. Every new discovery of light-producing materials; every invention for using these materials; every contrivance for cheapening light; seems to give a new impulse to gas-lighting; and so, larger buildings, additional gas-holders and purifiers, larger and greater lengths of mains, and what seems easiest of all, an increase of capital, are in constant demand.

During the last winter, complaints have been frequent that the London gas contained a greater quantity of sulphur than usual; more than is allowed by Act of Parliament (twenty grains in 100 cubic feet of gas). The subject has many difficulties connected with it. The formation of bisulphide of carbon is easier understood than the means of its removal. Mr. Barlow having been consulted, it appears that the question has by him been remitted to Paris, and is to be thoroughly investigated by French chemists. Whatever may be due to the qualities of coal and to the temperature of carbonization, I believe some of the recently adopted processes of purification are also the causes of the complaints.

The Gas Power Engine (*Moteur Lenoir*), is just introduced from France, where it is said to have been brought to great perfection, and to have become a thoroughly practical and hard-working machine; and so general in its application that there is a difficulty in keeping pace with the demand. The *motor* in this engine, as the name implies, is coal-gas, mixed with a definite quantity of atmospheric air, and exploded by a spark of electricity. M. Lenoir's invention is taken in hand by Messrs. Barrett, Exall & Andrews, Kategrove Iron-Works, Reading, whose long established reputation for machinery is a sufficient guarantee that they know what they are about, and will not promise more than they are able to perform. The appeal is first, and specially made to gas companies, as being most interested in giving a start to the gas engine in this country. The estimated consumption of gas is, say, 70 cubic feet per horse power per hour.

The Sheffield calamity! What can be said about it? You will have seen the reports describing—no not *describing*—for it is just there that the powers of thought, and language, and description fail; and so it is better to say, you have seen the published accounts of the sudden bursting of the embankment, and which, in that terrible night, caused such desolation. You will also have seen the report of the inquest, and the verdict of the jury; and, in common with others, you no doubt will be amazed at the small amount of information which was elicited, and the little that is known, or, at any rate, made known, as to the real cause of the accident. Familiarized from my very childhood with the making and maintaining of embankments, many miles in extent, which have to keep out the sea, and which were never known to fail, unless, as happened once, the sea flowed bodily *over* them, I never could have supposed there was so little known of, what appears to be the commonest principles for constructing for such a purpose, a sound and perfectly secure resisting medium.

The street-lamp question is not settled; and if its discussion is to be conducted as it has been of late, there is no probability of arriving at any very satis-

factory conclusion about it. The issues are in a smaller space than they were a few months ago. It is not so much a matter of disputation whether gas ought to be supplied as heretofore by contract, as it is whether the average meter system advocated by Mr. Hughes, is admissible. On one side we have the editor of the *Journal of Gas-Lighting* affirming that the average meter system has been a failure wherever it has been tried; and on the other, Mr. Hughes speaks as confidently of his successes. Out of all this highly-heated partizanship some good will be extracted. The actual facts may be misrepresented, but they can't be wholly concealed. Discord and distrust have so long existed, and so long been complained about, that it might have been supposed that gas companies would have been willing to have conceded something for the sake of amity. A meter to each lamp, and the management of the lamps under the sole control of the public authorities, will put an end to the differences. Everything will then be plain and intelligible.

S. G.

TO GAS COMPANIES.

The following circular, which has been issued by the Committee on Coal, of the Metropolitan Fair for the benefit of the United States Sanitary Commission, we commend to the attention of gas companies:

TO GAS COMPANIES AND CONSUMERS OF COAL.

The thousand tons of "South Leverson's Gas Coals," (contributed by George Elliott, of London, and the freight upon which was contributed by James McHenry, Esq.), are soon expected to arrive by the ship *Gibraltar*, at this port. As it is desirable to realize the largest amount possible from this munificent gift, the undersigned propose, if practicable, to sell the same "to arrive." Written proposals for the whole, or any part thereof, may be made to any one of the undersigned, and such proposals are now solicited.

As to the quality of the above coal, the undersigned refer to the following extract from a letter written by Cyrus W. Field, Esq. (through whose instrumentality this generous gift was obtained), to the Rev. Dr. Bellows, viz.:

"This coal is the 'South Leverson's Gas Coals,' of the best quality, and should bring a high price at New York at the present time. It has occurred to me that the different Gas Companies in New York, Brooklyn, Harlem, and Newark, might each be willing to pay an *extra price* for one or two hundred tons of these coals, as the entire amount that they sell for goes through the United States Sanitary Commission for the relief of our sick and wounded soldiers."

It is particularly desirable that this coal should realize as large an amount as possible for the object to which it is devoted, on account of the international character of the gift, the coal being the contribution of one large-hearted English merchant, and the freight (amounting to £886 15s. 11d.) of another.

Committee on Coal, &c.:

GEO. A. HOYT, Treasurer Pennsylvania Coal Co., Trinity Building.

FRED'K C. OAKLEY, Coal Dealer, 74 West 32d st, or at Howard Ins. Co, No. 56 Wall st.

OLIVER BRYAN, No. 29 South street.

DANIEL B. WHITLOCK, South street.

S. B. JANES, Chairman, No. 24 William st.

THE LAKE TUNNEL, AT CHICAGO.—A Chicago paper says that the recent heavy rains have partially stopped the workmen engaged in sinking the shaft of the Lake tunnel at the water-works, owing to the consequent large amount of surface water, which has soaked down through the quicksand and forces its way up from beneath the cylinder. A steam-pump has been rigged and the water pumped out, but, until the head of surface water is all removed, no further excavation will be made. The workmen have reached a depth of sixteen feet, and two of the cylinders have been placed in position. The contractors say that by excavating some four feet more, they will come to a stratum of thick blue clay, and when once the excavation is completed in this, there will be no further trouble to contend with. The cylinders are bolted together in a cement formed of iron filings, sulphur, and other chemicals, forming a joint perfectly impervious to water.

WATER METERS IN PHILADELPHIA.

Water meters are to be tried here for all large consumers. Mr. Birkinbine, since his recent induction into the office of Chief Engineer, has brought about this important reform. The following circular has been issued from his office:—

DEPARTMENT FOR SUPPLYING THE CITY WITH WATER.

Regulations, under which water will be supplied to large consumers by measurement, adopted by the Committee on Water, April 5th, 1864.

First, That water may be sold by measurement, through such a meter as approved by the Chief Engineer of the Water Works, to be provided and inserted at the expense of the party to be supplied with water through it.

Second, The water to be furnished at the following rates, per one hundred gallons. Bills to be rendered quarterly, to the consumers; a discount of tenper cent to be allowed upon the bills, if paid within five days after presentation, at the Register's Office, and a penalty of ten per cent. to be added if not paid within thirty days; when the Register shall notify the consumer by writing, and stop off the water if the bill and penalty be not paid within five days of such notice.

Rates at which Water will be furnished by Measurement.

For from one thousand to ten thousand gallons per day, two cents per hundred gallons. For from ten thousand to twenty thousand gallons per day, one and a half cents per one hundred gallons. For from twenty thousand gallons per day and upward, one cent per hundred gallons.

HENRY P. M. BIRKINBINE,
Chief Engineer.

PROSSER'S LIME LIGHT.

The Lime Light has recently been introduced, on trial, into lighthouses, where it promises to prove a formidable rival to Holmes' electric light. At the South Foreland Point, Mr. Prosser's lamp for the production of lime light was placed three years ago in the upper lighthouse. The lamp was fixed in the centre of the Fresnel apparatus, which had already been employed with the electric light, and which was adjusted to the use of a forewicked oil lamp, the burner of which was 3¾ inches in diameter. We take from the report of Professor Faraday, made to the Trinity House, on the 11th of June, last year, an account of the light, in regard to its working and success in the Upper Lighthouse at the South Foreland.

"The lamp consists of a central octoedral prism of quicklime, built up of many small pieces of lime, from chalk; it is about 3¾ inches in diameter and 16 inches long. It is supported by a clock, which, when in action, lifts it perpendicularly, at the rate of one inch per hour. Eight gas jets, conveying mixed oxygen and hydrogen, are placed at equidistances around this lime, in a horizontal plane. When the gases are lighted and directed against the lime, they produce eight places of intense ignition; and as the lime core is about 11.4 in circumference, the centres of these eight frames are about 1.4 inches apart.

"The lamp practice in the lantern is very easy; the jets are easily and safely lighted and adjusted. The action then goes on for hours together without change. The clock raises the lime; draughts do not affect the light; there is apparently no circumstance present which can cause derangement, and, as far as appears by theory or practice, the lamp may be left until sunrise untouched, provided gas be regularly supplied from below. The lamp is easier of management than a common oil lamp. It is easily replaced, in case of need, by the ordinary oil lamp; and that has been done in times varying from seven minutes to ten minutes or more.

"The light produced is very white and beautiful in character, far surpassing that of oil or gas flame in its intensity, but not equal to the electric spark; but then it is much larger in dimension. It is the light of a planet, whereas the electric light is like that of a star. It streams out from the lantern over the surrounding space in great abundance.

"The good and constant condition of the lamp will depend upon the sufficient and steady supply of the gases required. At present these are oxygen and hydrogen.

"The oxygen is made by the ignition of the native peroxide of manganese, in iron retorts fixed in a furnace, heated to bright redness by coke.

"The oxygen after being passed through a washer, is conducted to a gas-holder capable of holding 600 cubic feet of gas; it is outside the building, appears to be steady in its action, and fit for its peculiar service. The pipes conveying the gas are 1½ inches diameter outside the tower, and one inch in the tower. No inconvenience has as yet been experienced, at Westminister Bridge or elsewhere, from the action of cold on such exposed pipes. There are cocks at the gas-holder, and also in the lantern, governing the progress of the gas; the pressure upon it, when the lamp is burning, is six inches of water.

"The hydrogen gas is at present made by heating to redness a mixture of equal weights of iron borings and crushed coke-dust in iron tubes placed in a special furnace, and then passing over it a stream of steam. There are three tubes, which require only once charging for the day; and they, with the furnace, seem to do their duty very well. The gas is passed through a washer, as in the former case, and then on to a gasometer of the same size and arrangement as that for the oxygen. A sufficient supply for the night's consumption is produced in three hours.

"There is an apparatus for the generation of hydrogen by the action of diluted sulphuric acid on iron or zinc. It consists of three large earthenware bottles; it has been used, and may be used again if occasion require it. Two men were at work in the gas department.

"The whole quantity of gas burnt in the 12 hours upon the six jets is about 560 cubic feet, which is nearly at the rate of 7-7 cubic feet per jet per hour. The proportion of the two gases is about 248 oxygen to 312 hydrogen, or 1 to 1.26; if the gases were pure it should be as 1 to 2. The introduction of the common air at the charging will account for much of this—impurity of the manganese for much more."—*Social Science Review.*

GAS EXPLOSION IN ENGLAND.—At the Civil Court, at Lewes, England, an action has been brought by a man named Mose, and his wife, against the Hastings and St. Leonard's Gas Company, for damages for injuries received from an explosion of gas at the latter place, which happened December 22d, 1862. Between twelve and one o'clock in the day, gas was found by the plaintiffs to be in their cellars and kitchen, and, after opening all doors and windows, and putting out all fires, they sent to the offices of the company, and gave information. No gas was laid on to the plaintiffs' house, but a main of the company passed within a few feet of the plaintiffs' cellars, and the gas had found its way from the main (which was fractured) through the walls of the cellars of the plaintiffs, and of the two next-door neighbors on each side. About five o'clock in the afternoon, a gas-fitter was sent down by the company, and he, after inspecting the cellar, left. About half-past five, two reports were heard, and the plaintiffs' house was shaken to its foundation, and set on fire. Some of the ceilings fell, and the door of the kitchen was blown across the room. The plaintiff's wife, who was in the kitchen, was severely injured, and she was confined to her bed for some weeks. The gas company repaired the houses, and paid for medical attendance on her, and offered about £8 further, in full of all demands. This was not considered sufficient, and hence this action. Mr. Serjeant Parry and Mr. Shaw were for the plaintiffs; Mr. Hawkins, Q. C., and Sir G. Honyman were for the company. The Lord Chief Baron left to the jury the question whether there had been negligence on the part of the company, either as to the defect in the main, or in not sending sooner after having notice of the escape. The jury gave a verdict for the plaintiffs of £167. The case lasted all day.

CINCINNATI, O.—The enormous price of coal which has been ruling during the winter at Cincinnati, has led many gas consumers to try the calorific powers of gas, and a very large number of gas stoves has been sold in that city. The stoves made by Mr. A. L. Bogart, 592 Broadway, have given great satisfaction, as they are entirely odorless, and free from any objectionable properties.

ANALYSIS OF THE WATER OF THE BRANDYWINE RIVER, FROM NEAR WILMINGTON, DELAWARE.

By Prof. AIKIN, *of the University of Maryland.*

My report of the analysis of three samples of water transmitted sometime since to the Water Committee of Wilmington, was restricted, so far as it regards the quantitative analysis, principally to results. The technical details of the means employed for obtaining those results were thought of too little interest to the public at large to be incorporated in a report intended for general perusal. As a matter of scientific interest, these details are important, and I propose now to supply them. In performing the work, I made no attempt to devise or introduce novelties, but will be satisfied with having fairly carried out, in the main, the methods suggested by the experienced analytical chemists of Europe. The balance employed was one of Oertling's best instruments, with agate planes and edges for beam and pans, and turning readily with 0.001 of a grain. The filters were of the best Swedish paper, and previous to use were freed from everything soluble, by dilute hydrochloric acid, and the various re-agents employed, I need hardly add, were all carefully verified. As the same course was pursued in the examination of all the samples, I will confine my remarks to the one marked P, which, as I afterwards learned, purported to be pure Brandywine water taken from the river, above all the objectionable points in that vicinity. Viewing the question as simply involving the comparative value of the three waters for economical purposes, I did not undertake to search for everything that had ever been found in natural waters, but directed my attention to those substances which are most frequently present, and which, by their presence or absence, stamp the character of the water. The substances sought for in the preliminary qualitative analysis were as follows: Potassa, Lime, Iron, Iodine, Phosphoric Acid, Soda, Magnesia, Manganese, Sulphuric Acid, Carbonic Acid, Ammonia, Alumina Chlorine, Nitric Acid, Silicic Acid. These were all apparently present except ammonia, iodine, nitric, and phosphoric acids. The unsuccessful search for those was thus conducted: One gallon (imp.) of water was acidulated with hydrochloric acid and evaporated to dryness, and the dry residue, intimately mingled, was divided into four equal parts, A, B, C, D. The parcel A was introduced into a quill tube, intimately mingled with caustic lime, moistened and gently warmed without developing the least trace of any ammoniacal reaction on a slip of moistened turmeric paper in the upper part of the tube. The parcel B was boiled with a small quantity of distilled water and filtered. A few drops of the filtrate was mingled with thin starch mucilage, and a drop of dilute chlorine water, added without any indication of any color reaction with the starch. A drop of the same filtrate was placed on starch paper, and near it a drop of the chlorine water; on allowing them to mingle slowly there was no indication of any color reaction around the edge of the drop. Another portion of the filtrate was evaporated to dryness drop, by drop, on the same spot, on a white porcelain surface, and the film of saline matter left behind was then touched with a solution of phenyl in sulphuric acid, as suggested by Prof. Herman Spergel. Again the result was negative, there being a total absence of any color reaction. This test for nitric acid and nitrates I have so far found to give very satisfactory and very reliable results. If the surface on which the film of saline matter for examination rests, is gently warmed, the color action that follows the contact of the phenyl solution is prompt and (with the subsequent use of ammonia) characteristic, if nitrates are present. And the absence of such immediate action is equally conclusive, they supplying a very good illustration for the lecture-room. The remainder of the filtrate was acidified with hydrochloric acid and divided between two tubes. To one was added a solution of molybdate of ammonia in hydrochloric acid, and in the other I dropped a fragment of the solid molybdate, having sometimes obtained a yellow tinge on the white surface of the solid salt when the action of the reagent in solution was very indistinct. In this instance, both methods failed to supply any evidence of the presence of phosphoric acid. Of the substances found, some were present only as a mere trace, potassa, iron, manganese, and alumina, were not indicated in sufficient quantity to be determined by weight. A portion of the residual filtrate, left after the precipitation of all the lime and magnesia in the search for those bases, was evaporated to dryness, ignited thoroughly, re-dissolved in hydrochloric acid, and examined with bichloride of platinum. It yielded a faint but apparently distinct trace of potassa. The parcel C was dissolved in dilute hydrochloric acid, and the solution divided into two equal parts. One of these gave with sulpho-cyanide of kalium a distinct trace of iron. The other portion of the solution was treated with chloride of ammonium and ammonia, and precipitated with sulphide of ammonium. The very slight precipitate visible after standing over night was collected on a filter, dried, and ignited with the filter, and the ash examined before the blow-pipe with carbonate of soda, and with microcosmic salt. Both gave sufficient indication to enable me to decide on the presence of manganese. But so trifling in amount that I could only conclude that the precipitate, slight as it was, must have been due principally to the presence of alumina. In regard to this latter, I am inclined to attach less importance to its indication, since it may have been supplied from the porcelain vessels used in the work. Being satisfied that the remaining substances were to be found in appreciable quantities, the quantitative analysis proceeded as follows: One-half gallon of water was boiled briskly for an hour in a graduated porcelain dish, the original bulk being maintained by the occasional addition of distilled water. The deposit thus obtained, collected, and dried below 300° F. weighed 0.959 gr. and dissolved with effervescence in dilute hydrochloric acid. This solution with oxalete of ammonia gave a precipitate, which, after being carefully ignited, yielded 0.761+ gr. of carbonate of lime, equal to 1.523 grs. to the gallon. The filtrate from the oxalate of lime was treated with ammonia and phosphate of soda, and left standing twenty-four hours. The pyrophosphate of ammonia thus obtained weighed 0.263 gr., corresponding to 0.395 gr. of carbonate of magnesia to the gallon. The total amount of lime and magnesia was determined by operating on the solid residue left after the careful evaporation of one gallon (imp.) of water. This residue, dried below 300° F. weighed 4.550 grs. and lost 1.100 grs. when deprived of organic matter. From the ignited residue I obtained a solid deposit of silica weighing 0.130 gr., and the filtrate from the silica treated as above with oxalate of ammonia to get the lime, and after the separation of that base, with ammonia and phosphate of soda for the magnesia, gave as results 1.998 grs. of carbonate of lime, and 0.662 gr. of pyrophosphate of magnesia. Representing 1.119 grs. of lime and 0.238 gr. of magnesia to the gallon. The solid residue from another half gallon of water was ignited and divided into two equal parts. One of these was fused in a platina spoon, with a little carbonate of soda, dissolved in distilled water acidulated with hydrochloric acid, filtered, and the filtrate precipitated with chloride of barium and left at rest. The precipitated sulphate of baryta, after ignition, weighed 0.193 gr. equal to 0.264+gr. sulphuric acid to the gallon. The other portion of the ignited residue was treated with dilute nitric acid and preciptated with nitrate of silver. The chloride of silver thrown down, when dried, weighed 0.448+gr. representing 0.442+gr. of chlorine to the gallon. To determine the soda, a half-gallon of water was acidulated with sulphuric acid, evaporated to dryness, the residue drenched with sulphuric acid, evaporated again, and ignited. It then weighed 2.182+grs. and manifestly contained all the bases as sulphates together with the silicic acid. As the quantity of lime and magnesia was already known, the sulphates of those bulks could be exactly calculated, and the weight of those added to the weight of the silicic acid also known, and, the sum subtracted from the above gross weight leaves a remainder 0.403+gr. which I called sulphate of soda, and which corresponds to 0.352 gr. of soda to the gallon. Summing up these results, and we have for the inorganic solid contents of one gallon of water (imp.) as follows:

Lime	1.119 grs.
Magnesia	.238 "
Soda	.352 "
Chlorine	.442 "
Sulphuric Acid	0.265 "
Carbonic Acid	.972 grs.
Silicic "	.130 "
Aggregate	3.518 grs.

The weight of the carbonic acid was obtained by adding to that present in the earthy carbonates the quantity 0.095 gr. required for the estimated carbonate of soda of the analysis. The metallic bases of the chlorides, being above calculated as oxides, it becomes necessary to subtract from the above aggregate weight the quantity 0.098 gr. representing the oxygen equivalent of the chlorine. This leaves 3.420 grs. as the corrected weight of the solid contents of the gallon, and the difference between this and the weight of the residue obtained by evaporating a gallon of water amounting to 0.030 gr. must include the iron, manganese, potassa and alumina present in minute quantity, and must also cover any loss, so difficult to avoid entirely, in such work. In determining the most probable combinations of the above constituents I subtract first the earthy carbonates, next allotting to the sulphuric acid the lime required for the sulphate; the remaining lime is calculated as chloride of calcium. The magnesia, beyond what is present as carbonate is calculated, as chloride of magnesium, and the remaining chlorine with natrium as chloride of that metal. The soda remaining I have estimated as carbonate. This arrangement, is, of course entirely arbitrary as soon as we step beyond the deposited earthy carbonates, and may be varied indefinitely—the above seemed to me most probable. In conclusion, I will only add, that the arithmetical computations required were most conveniently performed by taking the equivalents for chlorine and phosphorus respectively, as 34.36 for the one, and 31. for the other.

ON THE PARLIAMENTARY STANDARD FOR TESTING THE ILLUMINATING POWER OF GAS.

The evidence on the Birmingham and District Gas Consumers' Bill has thrown some new light on the jugglery which habitually attends the testing of gas. Unless this jugglery be at once swept away, the intentions of the Legislature will be entirely defeated, all protection to the consumer, in regard to quality, will entirely cease, and the gas companies will be able to pass off 10-candle gas as if its quality were 13 or 14 candles.

In order to show how this matter stands, and how all the testing officers are leaning to the side of the companies by using burners which exaggerate the qualities of poor and weak gas, it is necessary to go back to the argand burner, which was in use at the time at the first testing clauses were introduced into gas acts; for instance, in the Taunton Gas Act, 1845, and the great Central Act, 1851. The best argand burner then known was an argand burner with fifteen holes and a seven-inch chimney, and this burner was generally made with a central opening, to admit the atmosphere air, varying from six-tenths to eight-tenths of an inch in diameter. Now, if the Legislature, in fixing on this burner for lighting gas had stereotyped and recorded this description of burner, and had required a specimen to be deposited for future reference, the standard could never have been tampered with, and the gas consumers would have gained the advantage which Parliament has intended to confer in gradually raising the standard from 10 to 14 and 16 sperm candles.

The good intentions of the Legislature, however, have been entirely perverted and thwarted by the insertion in many testing clauses of the words, "or other approved burner and chimney," thus actually giving the power to a gas company to pass off very inferior gas as of high illuminating power, by the use of an improved form of burner. Thus, in many acts of Parliament, where the standard is 14 sperm candles, it is evident that the gas may be no better in quality than that required in earlier acts, with a standard of only 10 sperm candles.

Not only has this extraordinary and most indefinite provision, allowing the gas to be tested with any burner, however superior, entirely vitiated the original object of the testing clauses, but the whole question has been tortured into a shape adverse to the gas consumer by the perverse and mistaken ingenuity of a

host of eminent and distinguished chemists who are professionally retained by the gas companies, and some of whom occupy the anomalous position of being paid testing officers or chemical examiners for public bodies, and, at the same time, professional advocates retained at extravagaut fees by gas companies to support their interest against that of the consumer.

It cannot be too generally known, and too forcibly impressed on the attention of the Legislature, that the supposed raising of the standard from 10 to 14 sperm candles is a mere delusion, so long as the standard can be varied at the mere will and caprice of the observers. In order to put the subject in the clearest light, and to show the unsatisfactory system which is now in progress, we must refer in some detail to the chemical and technical evidence which has been recently given before the Committee in the House of Lords on the Birmingham gas bills.

The first witness called on the part of the old Birmingham Company, to prove the quality of their gas, was Mr G. J. Parkisonn, who was lately superintendent of Mr. Parkinson's meter-works, in Cottage Lane, City Road. He says: "My observations were made with the old-fashioned metallic argand burner, having 15 holes and a 7-inch chimney. From July to December, 1861, the illuminating power of the gas was equal, on the average, to 12.44 sperm candles; from January to December, 1862, it was 12.55; and from January to July, 1863, 12.92. *I am aware that another burner is commonly used in London for photometric purposes, called the steatite or* Sugg's *burner. If I had made my observations with that, they would have shown* 10 *per cent. additional illuminating power in the gas.*"

Dr. Odling, the next witness, said the mean result of all his observations with the Parliamentary new argand gave an illuminating power of 13.8 sperm candles, and, he adds, "Comparing the burner used in these experiments with the steatite or Sugg's burner, I should say that the latter would give on the average 10 per cent. higher results, so that the mean would be 15 instead of 13.8 sperm candles."

He then gives an explanation of the superiority of Sugg's burner (which is entirely wrong), which shows very gross ignorance on the subject of testing gas, and which was afterwards entirely contradicted by Dr. Letheby. However, this ignorance only affects the parish of Lambeth, for which Dr. Odling officially tests the gas, and is not the point to which we wish now to direct attention. It is sufficient here to observe, that Dr. Odling agrees with Mr. Parkinson in attributing results 10 per cent. higher to Sugg's burner than to the Parliamentary new argand.

The next chemical witness is Dr. Hoffmann, undoubtedly a very able and distinguished chemist, but by no means accustomed to the photometrical examination of gases. This witness found the average illuminating power of the gas supplied by the old Birmingham Company to be 15 candles, and he adds, "by Dr. Letheby's photometer, with two cased candles, the result of 26 readings gave an illuminating power of 17.36 candles. He then explains that "the cased candles are candles forced into a case with an opening at the top just large enough for the wick to pass through, and the object is to keep the flame of the candle always at the same elevation. Surely Dr Hoffmann must be aware that there are other and far better ways of keeping the flame of the candle on a level with the centre of the disc, than the wretched one of forcing the candle into a case to be pushed up by the action of a spring. It is quite evident that Dr. Letheby's cased candles give much less light than candles burning in the ordinary manner, and hence Dr. Hoffmann finds the gas increased in illuminating power from 14.63 to 17.36 candles, showing a difference between the two modes of experimenting equal to nearly 20 per cent.

The evidence of Dr. Letheby, the next chemical witness, is more remarkable still, because he actually admitted that, as testing officer for the Corporation of London, he tests the gas with a totally different burner from that which was known as the best argand, when the standard of the Great Central Company was fixed in 1851. Dr. Letheby says: "I was examined as a witness on the Metropolis Gas Bill, 1860. The fact was not known at that time, that by giving a different form to these argand burners, the result in the testing of gas would be different. The burner in use at that time had an internal diameter of about six-tenths. *That is not the one I used to test the gas at Birmingham. I used the steatite burner, which I now employ in all my experiments.* I think it very essential that Parliament should define the standard burner."

Now, Dr. Letheby makes several mistakes in this statement. It was perfectly well known to many observers long before 1860, and, amongst others, to the writer of this article, that the form of the argand burner, particulary with reference to the passage of atmospheric air through the central opening, had a very serious influence on the illuminating power. The following are distinct modes of increasing the power of an argand burner consuming ordinary coal-gas, and these have all been long known to the writer:—1st. Contracting the central opening to about .45 to .5 of an inch diameter. 2d. By a perforated disc round the burner, and resting on the gallery which supports the burner (this is an addition to Suggs' burner, which renders it illegal as a testing instrument, except where the clause includes the words "or other approved burner"). 3d. By interposing a thin piece of paper or metal to contract the passage of air through the central opening. 4th. By placing a little contracted cap on the top of the chimney. Now, every one of these contrivances will considerably increase the power of the argand burner, and thus defeat the intentions of Parliament in prescribing a fixed standard. Moreover, all these contrivances act on the simple principle of diminishing the velocity of the current of atmospheric air, and thus allowing the minute particles of carbon, which the gas contains, to be longer suspended in the flame. Dr. Letheby produced before the committee three argand burners, each of which fulfils the conditions of the Acts of Parliament in having 15 holes and a 7-inch chimney, but each giving different results. "One, which is the common metallic burner, gives an illuminating power of 11 candles only; another, in which the internal aperture is much smaller, gives an illuminating power of 12 candles, and the other rather over 14." Thus, Dr. Letheby makes the difference between the old standard argand and the improved form nearly 30 per cent. He goes on to say that the Bengal or French argand gives 16 candles, as compared with 11, being an increase of nearly 15 per cent. As this burner, however, has 30 holes, and evidently does not comply with the conditions of the Acts of Parliament, it may be put out of consideration.

A very cursory glance at the chemical evidence from which we have quoted will thus show most conclusively that, owing to the vicious mode of testing which has crept into use, the standard prescribed by Parliament has become a perfect mockery and delusion. Instead of the standard being incrensed from 10 to 14 candles, the standard in reality, according to the practice of the testing officers, appears to be an elastic one, which can at any moment be expanded so as to make 10-candle gas appear to be 14.

It is not too much to say that the whole of the chemical evidence which has recently been given on this subject is a disgrace to the science of the country.

At all events, one may hope that it will forcibly impress Parliament with the necessity of fixing a standard which cannot be tampered with in this audacious manner. In conclusion, we advise the employers of Dr. Letheby and Dr. Odling to inquire into the circumstances under which they took upon themselves to change the burner which was originally used for trying the gas, to ascertain when Dr. Letheby adopted his ingenious manœuvre of the cased candles, and we sincerly trust, for the honor of both the learned doctors, that these extraordinary changes had no connection with their employment by gas companies, which employment seems now to form a considerable part of their occupation.—*Sanitary Reporter.*

GAS IN IRELAND.—An opposition gas company is about being formed in Dublin, Ireland. The *Sanitary Reporter* thinks that competition is much needed in Dublin, alleging as a reason that "the people have been subjected to fabulous prices for gas for forty years, and is now charged considerably over the fair market price." The *Reporter* thinks that gas ought to be furnished by the new company at 2s. 9d. per thousand cubic feet.

THE MONTREAL, C. W., GAS-WORKS.

A recent number of the Montreal *Transcript*, contains the following interesting account of the works of the new City Gas Company. From all that we have heard of this company, its affairs must be in a most prosperous condition:

Having lately had occasion to visit these important works, the possession of which in our midst may be said to confer upon us the most substantial claims to be considered as *enlightened citizens*, we were obligingly shown over the premises by the able Superintendent, Mr. John McElroy.

At the entrance, on the right of the gateway, is a substantial dwelling-house of two stories, containing the house and office of the Superintendent, while immediately on the left is a fine brick building, with panelled walls, erected upon the corner of Gabriel and Dalhousie streets. This is the new gas-holder house; it is 105 feet square, and contains one large gas holder 80 feet in diameter and 24 feet high, capable of holding 120,664 cubic feet of gas. A little higher up on the opposite side is a new coal shed, of brick and stone, 120x75 feet and 20 feet high. This building has a flat roof, and is capable of storing 3,000 tons of coal. There are also two other small sheds, on one each side the Retort house, capable of holding together 3,000 chaldrons. The new Retort house is 73x60, and has capacity for 60 retorts, with a steam-boiler of 30 horse power to heat tank houses, purifiers and pressure room. The new condenser house is 70 feetx20 feet, with a set of condensing pipes, 48 in number, 16 feet high, and 18 inches in diameter, with 6-inch air-pipe. This apparatus is capable of condensing 500,000 feet of gas per day.

We were next shown a series of offices in a new brick building at the bottom of the yard, the first of which was the new Puriyfying House, the dimensions of which are 60 feet by 48 feet, and 20 feet high. This apartment contains two scrubbers 12 feet high by 8 feet in diameter, used for the first process of purification, and 4 dry lime purifiers of a square form, 12 feet by 12 feet, and 4 feet high. In the centre, is the latest improved iron crab for removing the covers of the purifiers, and also the latest improved centre valve for changing the gas in the purifiers. Adjoining is the lime shed, where the lime is prepared for the purifiers.

Next to the purifying house is the Exhauster House, fitted with one of Beal's Exhausters, with an engine and boiler of ten horse power, all the machinery and apparatus in this department is kept in as neat order as paint and polish can produce. Still further on is the blacksmith's shop, fitted with lathes, and all the requisites for doing all the work for the company on the premises.

In another building on the west corner of the yard, is the meter house, which contains one of Thomas Glover's latest dry station meters, capable of passing 500,000 feet per day. In the workshops attached, all the ordinary meters are repaired, and here is placed one of Thomas Glover's proving machines for the purpose of proving the correct working of the meters. It is something like a small gasometer placed in a tank. The apparatus being filled with gas, a row of burners are lighted, and as the gas-holder sinks, the gas being exhausted by the burners, it carries an index finger down a graduated scale. At the same time, the gas is also passing through the meter on trial, the index finger of which, if the meter is in proper order, ought to indicate the same number of feet on a given time as that of the proving machine. If the meter indicates one-tenth part of a foot slower than the proving apparatus, it is allowed to pass, but if it indicates one per cent. faster, it is immediately detached and regulated, the slight difference between the two, if any, being allowed in favor of the public.

In passing up the yard we were shown a coke shed capable of storing 300 chaldrons of coke, also the old retort house, having 61 retorts. The old gas-holder house is about 186 feet by 80 feet, and containing two gas-holders 60 feet in diameter and 18 feet high.

In the rear of the office is a small testing house, for examining the quality of petroleum, coal, or rosin. It contains two small gas-holders, one 8 feet in diameter by 5 feet, and the other 4 feet by 2 feet 6 inches, with retorts, and all the necessary apparatus for making gas

on a small scale. Adjoining is the Governor's house, in which is placed an apparatus for regulating the pressure on the town; which is done by weights which can be increased or removed at pleasure.

The illuminating power of the gas is tested by a photometer, and reckoned by "candles." The general principle of the apparatus is as follows: A small screen, capable of being slided on a graduated scale, is fixed between a spermaceti candle of a certain weight, and an argand gas-burner, calculated to burn 5 feet per hour, the candle, 120 grs. Attached to the small screen, which consists of paper fixed in a frame, with a round stain upon it, are two mirrors, placed at such an angle as to reflect the stain from each side. The observer stands in front and having observed the reflections in both mirrors are equal, he estimates the amount of distance of each light from the screen, and so decides "how many candles" the illuminating power of the gas is worth. The gas used in the burner is passed through a delicate observation meter, so that its amount can be accurately ascertained, and at the end of the operation the candle is weighed. The observations are taken at stated intervals, by a minute clock, and their average computed, the illuminating power of the gas every evening being entered in a book for the purpose, together with the different descriptions of coal used in its manufacture, the number of "candles" diminishing or increasing according to the quality of the gas made.

We had the privilege of examining this test book from the 3d of January, 1863, to 31st December, and find the highest power of the gas 26 candles, and the lowest 16, averaging 21 candles for the year 1863. We also saw a testing operation performed by the Superintendent on the 2d instant, when the illuminating power of the gas was 25 candles, in five observations; also, a fine Bromine test in a bent glass tube, graduated for the purpose of ascertaining the illuminating power and specific gravity, and, also, a weighing machine for testing the weight of the gas, in comparison with atmospheric air. In the testing room we were also shown the model of a small lamp, the lower portion of which would either contain a meter, or a letter box, the latter we are sure would be a great convenience in many parts of our city and suburbs, and is well worthy the consideration of the Post-Office authorities.

After inspecting the various departments of the works, the visitor will hardly fail to be struck with the neatness and order which everywhere prevails, as well as with the numerous ingenious appliances used for regulating the manufacture, and promoting accurate dealings with the public. Any citizen who has inspected these works, when nex this gas jumps or burns blue (as the most orderly and well conducted gas will do at times) we are sure will view such irrelevant proceedings with a more charitable eye for the future.

The number of workmen employed is sixty, of these the stokers, being employed seven days in the week, make about seven dollars.

From all the men employed the strictest sobriety is exacted, and we are glad to have to chronicle the formation of the "Montreal New City Gas Company's Workmen's Benevolent Association," which was founded in 1860. Each member pays the sum of 12½ cents per week, and on the death of any member, the rest all contribute 25 cents. In case any member falls sick, he receives $3 a week as long as he is unable to work. Upon the death of a member a sum of $32 will be paid to his wife or nearest relation, but in case of the wife of a member dying, $20 will only be paid.

GAS IN ITALY.—The town of Caltagirone, in Sicily, is about to be lighted with gas.

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It consists of seventy-two parts Oxide of Iron, and twenty-eight parts Cement Lime Stone in the one hundred pounds.

It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

It is a perfect cover for all kinds of iron, tin, or wood-work, out-houses, and canvas coverings. It prevents and arrests the corrosion of metals, and is not affected by the action of salt, gases, acids or ammonia.

It hardens under water, as has been fully demonstrated by its application to gas-holders, by many of the largest gas companies in the United States; which companies having thoroughly tested its properties as herein claimed, pronounce in its favor over any other paints in the market, even though sold at double its price.

As a coating for patterns of iron or wood, when mixed with shellac, it is much superior to beeswax, oil, or shellac alone, as has been proven at the large founderies in the country.

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This Paint requires no more oil than dry lead or zinc, and much less than the ordinary mineral paints. It is free from any waste, and possesses a spreading and covering power unequaled.

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A liberal discount made to parties purchasing by the ton.

A Barrel or Ton will be forwarded to any gas companies desirous of testing its qualities, for which there will be no charge if it does not give entire satisfaction as being the cheapest and most durable of all other Paints in the market.

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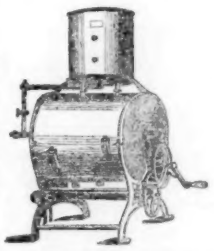
AUTOMATIC GAS MACHINE.



THIS MACHINE, which has been in constant use for more than two years, is now acknowledged to be the

Most Convenient,
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OF LIGHTING BUILDINGS OF ALL KINDS, out of the reach of regular gas-works, ever brought to public notice.

The SIMPLICITY OF THE APPARATUS, its ENTIRE FREEDOM FROM DANGER, the LITTLE ATTENTION REQUIRED, the EASE WITH WHICH IT IS MANAGED, and THE CHEAPNESS and SUPERIORITY OF THE LIGHT, has gained for it the favorable opinion of those acquainted with its merits.

The Machine takes up but little room; no disagreeable odor is experienced in its use; no fire is applied to the apparatus at all; it can be attached to ordinary gas-pipes used for coal-gas, and is burned through the same kind of fixtures.

These Machines are manufactured in Boston, by the AUTOMATIC GAS-MACHINE CO., and are for sale at their Store, 78 Washington street, Boston, and also at the Agency, MITCHELL, VANCE & CO.'s, No. 620 Broadway, New York.

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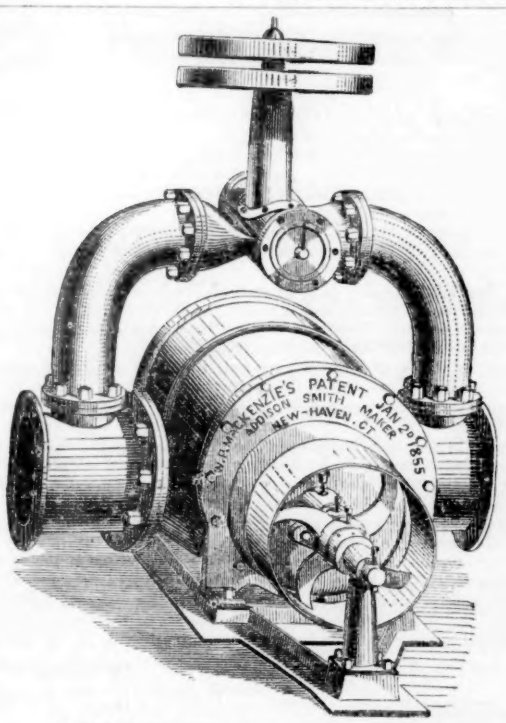

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Apply at the Gas-Works of St. Nicholas Hotel, No. 68 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

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THE PROPRIETORS of this unrivalled joint are now prepared to introduce it to general use, and to guarantee that, in all respects, it will fulfil perfectly all the requirements of either water, gas, or steam. It is a joint which remains in all situations absolutely tight.

The following illustrations, with the appended explanations, will give a good idea of the improvement:

Fig. 3.

Fig. 1.

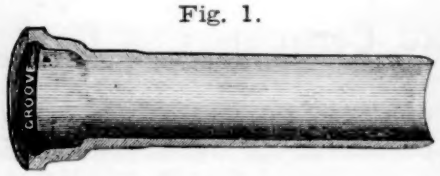

Fig. 2.

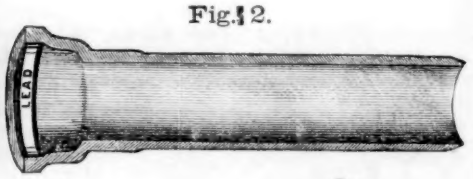

Fig. 4.

FIG. 1. Is a sectional view of a pipe showing a groove to receive a lead ring.

FIG. 2. Is a sectional view of a pipe showing a lead ring in the groove.

FIG. 3. Represents a former, which is used in the bell end of the pipe while casting the lead ring. Before using the former, however, a strip or belt of India rubber is first inserted in the socket, against which the former rests to prevent the lead escaping from the groove while being cast. Upon the cooling of the lead, the former and rubber ring are withdrawn from the socket, and the lead ring is left projecting inwards from the groove all around, forming an indestructible packing to receive the spigot-end of the pipe.

FIG. 4. Shows two pieces of pipe in connection with an hydraulic jack, by which the spigot-end of the pipe (which is cast tapering and may be cast in a chill), is forced into the lead ring in the groove which perfects the joint. A, represents the jack; B, B, the chains by which the pipes are drawn together; and C, C, pieces of pipe.

This ring joint packing may be cast at the foundry or any convenient place, and when delivered at the ditch, may be laid, and perfect joints formed, by any laborer, above or below the surface, or in ditches filled with water, there being *no joint ditching required*, and it can be laid with very great rapidity.

Among the economies realized by this joint may be enumerated, the saving in the weight of the pipe, in the amount of lead required to be used in forming the packing, in the labor of ditching, and in laying the pipe.

The bell or socket may be cast one-half the usual length, as the width of the groove requires, but from a half to one and a half inches, according to the size of the pipe, thus saving in the total weight about two hundred pounds per ton.

The weight of lead required to form this joint, as compared with the amount of lead used in forming a joint according to the old method, is fully seventy-five per cent. less, only so much being required as to maintain the compensating principle, or enough to allow (upon the raising or depressing of the line of pipe out of a direct line) what is lost upon one side of the ring packing, to take its place upon the other; thus securing flexibility of the joint without affecting its reliability. The use of yarn or hemp packing is dispensed with, the cost of which is an entire saving as compared with the old method of making joints.

The saving of labor in ditching is the total amount usually expended in digging joint-holes, there being *no joints to be caulked.*

The saving in labor in laying pipe furnished with this joint is a sum equal to the whole cost of carrying lead, fuel, ladles to the ditches, casting the lead, bailing out water, and the entire labor of caulking, less only the sum charged for casting the lead ring packing at the foundry, which is comparatively trifling. This last-mentioned economy has been estimated by the best engineers at seventy-five per cent., or the same as the saving in the quantity of lead used.

The cost of pipe cast from our patterns is the same per ton as pipe cast for the old form of joint. The principal iron-founders propose to charge the same price.

We have submitted these joints in water-pipes to a pressure of two hundred and fifty pounds to the square inch, and they have remained perfectly tight. It has also been submitted for months in gas-pipes to the ordinary pressure of our city gas-mains, without any leakage whatever. We are aware that these statements may be deemed by many extravagant, but the merits of the improvement warrant them all, and the most skeptical may be fully convinced by an investigation of its value, and by witnessing the tests to which we submit it, or by its use under any conceivable circumstances.

TESTIMONIALS.

OFFICE OF THE WATER COMMISSIONERS,
CITY HALL, JERSEY CITY, October 14th, 1863.

Dear Sir,—On the 26th of May last, about two hundred and sixty feet of cast-iron water-pipes, six inches in diameter, with joints constructed according to your invention, were laid for the Jersey City Water-Works, in Prospect street.

The operation of uniting the joints of the pipes, was performed with remarkable facility, and with an important saving in time, materials, and labor. The joints proved perfectly water-tight, after turning the full head of water on the pipes.

In my opinion, your invention has proved entirely successful, and will be found highly beneficial to water companies.

Yours, respectfully,
ROBT. C. BACOT,
Superintendent and Engineer, Jersey City Water-Works.

MR. R. C. ROBBINS.

ENGINEER'S OFFICE, CROTON AQUEDUCT DEPARTMENT.

Dear Sir,—I have examined your plan for making joints in cast-iron water pipes, and have a report from one of my assistants, of certain experiments made by you, to prove the certainty and economy with which the joints can be made, and their stability when finished.

I think the experiments showed that the joints could be made quite as rapidly, if not more rapidly, than those made in the ordinary method now in use; the quantity of lead used was less than that required in the common joint, and no yarn packing was required. In these respects, your joint seems superior.

After the joints were made, a pressure of three hundred pounds to the square inch, was put upon the pipe in such a manner as to test the efficiency of the joint to prevent both leakage of water, and separation of the pipes from each other longitudinally. This pressure failed to produce either leakage at the joint, or separation, so long as the pipes lay in a direct line; but on deflecting them six and a half inches, in a length of twelve feet, the joint commenced leaking. It is fair to add, that this is a greater deflection than would often be found necessary in laying pipe.

I think the efficiency of the joint in both the points tested in this last experiment, might be increased by increasing the quantity of lead, both in thickness and width.

Altogether, the result of the experiments was such that I have determined to make a more thorough test of your invention by putting down about one thousand feet of pipe, when we commence our operations for the coming season.

The diameter of the pipe subjected to experiment, was six inches, and is the same size that I propose to put down next year.

I am, very respectfully, your obedient servant,
A. W. CRAVEN, Chief Engineer, &c.

To R. C. ROBBINS, Esq., Jersey City.

METROPOLITAN GAS-WORKS,
ENGINEER'S OFFICE, NEW YORK, October 9th, 1863.

Dear Sir,—The undersigned had the pleasure of being present at an experimental test of your patent joint for gas and water pipe, made at the yard of the Croton Aqueduct Department, and cheerfully testify to the results obtained, namely:

First experiment was made with two lengths of eight-inch pipe, jointed together, when a pressure of three hundred pounds to the square inch was applied. This pressure did not force the pipe apart, nor start the joints, but they remained, during this experiment, perfectly tight.

Second experiment was made by deflecting the pipe five inches, which is about equal to eighteen inches in one hundred feet, and the same pressure applied, which caused a small leak at the joints.

Third experiment was made by taking the pipes apart and rejointing them, when the same pressure was applied when lying straight and when deflected; at this experiment there was no leakage.

From these severe tests it is my impression that the superiority of your patent joint has been made manifest, and that it must eventually supersede the old way of jointing pipes together, saving both time and material.

Wishing you success in your enterprise,

I am, very respectfully, yours, &c.,
AMBROSE J. WHITE, Engineer.

To R. C. ROBBINS, Esq.

OFFICE OF THE METROPOLITAN GAS-LIGHT COMPANY,
NEW YORK, October 9th, 1863.

Dear Sir,—Having been present at the testing of your patent joint for gas and water pipe, at the yard of the Croton Aqueduct Department, I can testify to the results as stated by Col. A. J. White and fully concur with him in the opinion expressed in his letter to you of this date.

Very respectfully, yours,
W. TITUS, Secretary.

R. C. ROBBINS, Esq.

NEW YORK, October 23d, 1863.

Gentlemen,—I am pleased to be able to inform you, that we are fully satisfied that we have done well in adopting your "Improved Joint," in the construction of an aqueduct which we are now building on Oil Creek, Northwestern Pennsylvania.

We have ten miles of three and four inch pipe to lay this season, and, in our estimation, the perfection of the joint, economy in lead, and rapidity with which the pipe can be laid, render it entirely preferable to any other method of laying pipe.

Our Mr. Hutchings advises us that he is putting down the three and four inch pipe at the rate of twenty-five to thirty lengths per hour, with two men in the trench. We are much pleased with this result.

Respectfully yours,
HUTCHINGS & FOSTER.

Messrs. R. C. ROBBINS & Co.

For further information, or for prices and terms, which will be very reasonable, apply to

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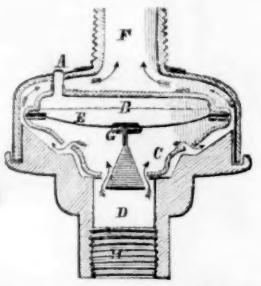
PATENT

AUTOMATIC GAS CONTROLLER.



Notice to Gas Companies and Consumers of Gas generally.

WE RESPECTFULLY INVITE YOUR ATTENTION TO THE FOLLOWING TRUTHFUL DESCRIPTION OF THE construction and operation of this recent and most important invention; its application to every street lamp, and on the fixtures within the works of the Gas Companies, as well as for the use of the general consumer, will be found to effect perfectly and reliably, the object so long sought for, viz.: **a perfect control of the Gas under varying pressures, emitting the Gas at the burner without force, and without increase or diminution of quantity, and hence promoting the highest possible illuminating power of the Gas.**

THE AUTOMATIC GAS CONTROLLER

Is designed to occupy the place of the gas-burner. Within the circumference of a small cylinder, below the burner, is placed a conical valve, attached to a movable diaphragm, the valve and valve seat is proportioned, so that under a supply of Gas, varying in pressure from four-tenths to five inches, the burner will continue to produce the same consumption and development. The unerring accuracy of movement of the Diaphragm at every change of pressure, whether gradual or sudden, and its positive control of the valve which admits, by its proportionate increased or diminished aperture, the same unvarying amount of Gas, has elicited the unqualified approbation of engineers and other experts in the profession.

The simplicity of its construction, and materials used, are a sure guarantee of its durability and continued successful operation. They afford to the consumer of Gas the advantage of a **superior light, with the greatest possible economy**; and for the Gas Company, they control the Street Lamps, affording a more satisfactory light for the public, without waste.

The public are invited to witness its operation, at the Office of the Company; and samples will be sent to Gas Companies for experiment, on applicatiou by letter or otherwise.

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New York.

We are permitted to refer to the following Gentlemen, who have thoroughly examined our Gas Controller:

GEO. H. KITCHEN, Inspector of Gas Meters, 561 Broadway.
CHAS. ROOME, President Manhattan Gas Company.
J. H. ADAM, President New York Gas Company.
PETER COOPER, Cooper Institute.
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ARCH AND TWENTY-SECOND STREETS, PHILADELPHIA,
1 BARRETT STREET, BOSTON, will meet with prompt attention.

STEAM-PUMPS.

WORTHINGTON'S STEAM PUMPS, extensively used by Gas-Light Companies. For Sale at greatly Reduced Prices.

Also, a new and highly successful Pump, driven by water pressure, requiring no attention or repairs, and the most economical water motor yet constructed.

Patent GATES, for Water and Steam-stops.

HENRY R. WORTHINGTON,
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WEST'S IMPROVED PUMPS, the most Simple, Durable, and Powerful, and the Cheapest in use.

J. D. WEST & CO.,
179 BROADWAY, N. Y.

PETROLEUM GAS.

THE AUBIN GAS-WORKS COMPANY, OF ALBANY, N. Y., have adapted their Works to petroleum and the heavy oil obtained from its distillation. Parties desiring information will be referred to Village Gas-Works thus adapted, where the ordinary yield of gas is from 150 to 200 cubic feet per gallon of oil. This yield, and the great improvements which experience has added to the Aubin Works, enable them to make a rich gas at a low cost—the only way to compete with kerosene.

TO GAS COMPANIES.

THE UNDERSIGNED DESIRES TO undertake the supervision of several small Gas-works, to visit and examine them as often as may be necessary; to obtain and inspect their coal, castings, fire-brick, and other materials; and to manage their general business in such a manner that they shall be under such supervision as is now attainable in large works, at much increased cost. Also, to advise as general Consulting Engineer and expert in practical chemistry.

CHAS. M. CRESSON,
Late Asst. Engineer of the Philadelphia Gas-works,
417 Walnut st., Philadelphia.

ANALYTICAL CHEMIST

C. ELTON BUCK,

Analytical and Consulting CHEMIST,

39 NASSAU STREET, NEW YORK,

Analyses of Ores, Minerals, Soils, Guanos, Coals, &c., and Tests of Commercial Articles, carefully and promptly made. Consultations may be had, and opinions given on Chemical questions. Samples for analysis from a distance, may be sent by mail or express, directed to the Laboratory as above.

GLYCERIN

FOR

Filling Wet Gas-Meters,

Cheaper than Whisky or any other substance.

We have furnished the Cincinnati Gas and Coke Company 300 barrels Glycerin, for filling their wet meters, and are now ready to supply other Gas Companies at the lowest cash prices.

We warrant our Glycerin not to corrode the meter metal, nor to freeze at the lowest ordinary temperature, nor to evaporate.

HARTMAN & LAIST,
Manufacturing Chemists,
Cincinnati, O.

Office 64 Sycamore.

NEW YORK FIRE-BRICK and Clay Retort Works. (Branch Works at Kreischerville, Staten Island.)

B. KREISCHER, office 56 Goerck street, corner Delancy street, New York.

GAS RETORTS, TILES and FIRE-BRICK of all shapes and sizes. FIRE MORTAR, CLAY, and SAND. Articles of every description made to order at the shortest notice. B. KREISCHER.

WOODEN PURIFYING TRAYS.

PATENT

Conically Slotted Solid Wood Sieves

FOR GAS PURIFIERS.

CAUTION

TO

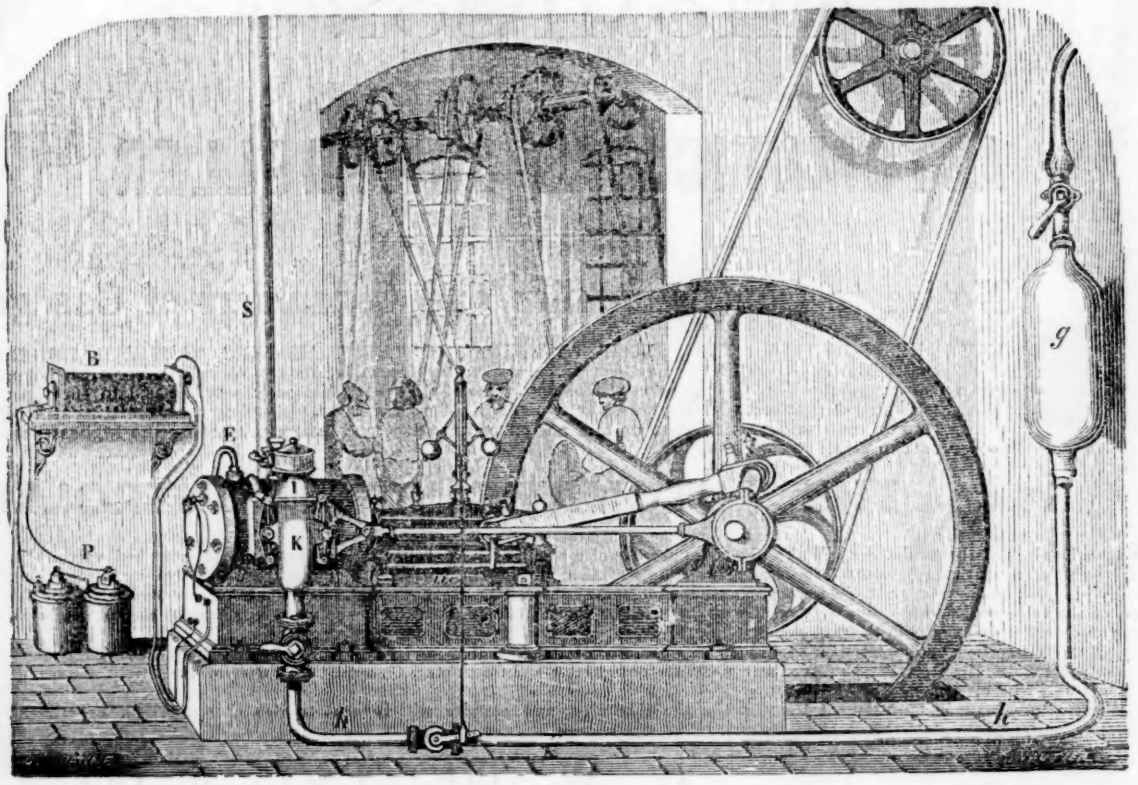
GAS MANUFACTURERS.

The Conically Slotted Solid Wood Tray was patented 21st October, 1862, by N. O. Hawxhurst, assignee of Wm. Combe, and all persons are cautioned against purchasing such trays of R. G. Hunt, or any other person except the subscriber, as it is a direct infringment of said patent. The following companies are now using these trays.

Manhattan, New York,
Williamsburgh,
Brooklyn,
Albany,
Baltimore,
Philadelphia,
Chicago.
Louisville,
And numerous others.

Orders received by mail or otherwise.

JOHN L. CHEESMAN,
147 Ave. C, New York City.



MOTEUR—LENOIR.

LENOIR GAS ENGINE.

A sample Engine has arrived from Paris and is now in the Custom-House in this city. It will soon be erected and put in practical operation, when due notice will be given to the public. The lateness of its arrival precludes further notice of it in this advertisement than to say to those who are unacquainted with the principle, that the

LENOIR GAS ENGINE

Requires no Fire and makes no Smoke,

No Noise, no Dirt, and cannot Explode.

It is propelled by the expansion of Air, dilated by the explosion of Gas, which is ignited by the

ELECTRIC SPARK.

There is no end to the purposes for which the Lenoir Gas Engine will be useful, and in the next number of the AMERICAN GAS-LIGHT JOURNAL will be given extracts from foreign papers of its

SAFETY, ADAPTABILITY, AND ECONOMY.

In the meantime, enquiries may be addressed to the

Editor of the American Gas-Light Journal,
NEW YORK.